

FLIGHT

The
AIRCRAFT
ENGINEER
&
AIRSHIPS

First Aero Weekly in the World

Founder and Editor: STANLEY SPOONER

A Journal devoted to the Interests, Practice, and Progress of Aerial Locomotion and Transport

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EDITORIAL COMMENT



THE Air Pageant, which was held at Hendon last Saturday in aid of the Royal Air Force Fund, was by a long way the most successful aerial affair which has ever been held, in this country at least. More than 40,000 people paid for admission to the aerodrome. The weather, fortunately, kept fine, and the programme was one of sustained interest throughout, the more so as an almost absolutely accurate time-table was adhered to. Everything went off as smoothly as possible, and there was not a single untoward incident during the whole of the afternoon. The nearest approach there was to an accident was the bursting of an aeroplane tyre! It seems almost ludicrous to mention such an incident, but it is really worth while, for the reason that it drives home the lesson of how absolutely safe flying has become, when such an exhibition as was given on Saturday can pass off with so clear a bill of accident.

We need not refer to the programme. That is quite adequately dealt with in our report of the Pageant which appears elsewhere. There are, however, certain lessons and deductions to be drawn from its success which are well worth touching upon. In the first place, the attendance of over 40,000 people who paid for admission, to say nothing of many thousands who saw something of the Pageant from outside the aerodrome, demonstrates that the interest of the public in flying is very much alive. All it requires is a periodical stimulus to make it both active and permanent. We have often laboured the point that it is absolutely essential to the future of flying that there should be a healthy volume of public opinion, well formed and intelligently appreciative of the possibilities of aviation, in order that the hands of those who are striving to keep this country in the forefront of progress may be strengthened. Nothing can contribute so much to the formation of that opinion as such affairs as the Pageant or events like the Aerial Derby. Therefore, apart altogether from the objects for which the Pageant was organised, we regard it as having had an effect on the movement which is very much to the good.

Again, it had considerable value from the point of

DIARY OF FORTHCOMING EVENTS.

Club Secretaries and others desirous of announcing the dates of important fixtures are invited to send particulars for inclusion in the following list:

- July 7 to 21 Exhibition of Aircraft Paintings by Mr. Geoffrey Watson, at Brook Street Art Gallery, 14, Brook Street, W., in Aid of R.A.F. Memorial Fund
- July 9 to 20 S.B.A.C. International Aero Exhibition at Olympia
- July 17 to 31 Seaplane Contests at Antwerp
- July 24 ... Aerial Derby at Hendon
- Aug. 3 ... Air Ministry Competition (Large and Small Type Aeroplanes)
- Aug. 28 & 29 Schneider International Race, Venice
- Sept. 1 ... Air Ministry Competition (Seaplanes)
- Sept. ... International aviation week (with competitions) at Brescia, Italy
- Sept. 8, 9 Fédération Aéronautique Internationale Conference, Geneva
- Sept. 27 to Oct. 2 Gordon-Bennett Aviation Cup, France
- Oct. 23 ... Gordon-Bennett Balloon Race, Indianapolis, U.S.A.

view of the industry, since it has shown to those engaged in the latter that the public is by no means apathetic towards aviation, but that on the contrary there is a great and growing belief in its future and in its possibilities. Once more the success of the programme and the entire absence of accident must have shown to every one of the 40,000 who were looking on that the aeroplane has long ceased to be a toy or a scientific curiosity and has now taken its place beside the motor-car and other methods of transport. It showed that whatever another vehicle can do the aeroplane can do as well or better and at a far greater speed. After all, the future of civil aviation depends upon the amount of faith the public has in it as a means of safe, reliable transport, and the more sensational the object-lesson the better and quicker it will be assimilated. There were enough of thrills on Saturday to make for sensation and the better to drive home the lesson of reliability and safety. Not only did the Air Ministry do well in organising the Pageant, having regard to the primary object in view, but it has done much for the cause of civil aviation, and for that of the aerial defence of the Empire.

The Progress of Civil Flying

A Parliamentary Paper, issued last week, contains an interesting survey of the progress of civil aviation during the six months ending on March 31 last. In a general way the Report, which is compiled by the Department of the Controller-General of Civil Aviation, shows that while this country has maintained its lead in the air, especially in regard to organisation, most other countries have realised that there is a future for aviation and are adopting methods, as for example the granting of subsidies, the creation of air departments, and the organisation of experimental services, and using their best endeavours to adapt aviation to commercial uses. General Sykes takes the opportunity in this connection of again pointing out the importance to the Empire of air communications, and presses the point that during the experimental period some measure of State assistance is essential. In many respects, he says, the British Empire is in a unique position. Imperial solidarity can be strengthened by a system of intercommunication by air, and protection is as essential to national security from the air as from the sea. Strong air forces can be guaranteed in time of emergency by a strong reserve of competent airmen and reliable machines such as the expansion of commercial aviation will ensure. In this expansion the long distances and the undeveloped character of many parts of the Empire are favourable factors.

In the last half-yearly Report issued by the Department of Civil Aviation three methods of Government assistance were suggested. These in their order were Direct Government subsidies; assistance in the form of grants to approved companies according to mileage and weight carried, and the provision of key aerodromes and shed accommodation at home and on the Imperial Air routes. Up to the present time the Department of Civil Aviation has only been in a position to act in accordance with the spirit of the last of these recommendations, and has been compelled to confine its activity to the work of improving ground organisation. In addition to this the Department has been engaged

on the planning of air routes, the equipment of aerodromes, the provision of Customs facilities for international flying, the improvement of wireless and other means of communication, and the introduction into Parliament of a Bill to meet the requirements of the International Air Convention. In addition, the Department is responsible for the meteorological service of the country in all its branches. By these methods private enterprise has been assisted in organising air services to the Continent which, even in the winter months under review, were conducted with considerable regularity.

More Assistance Needed

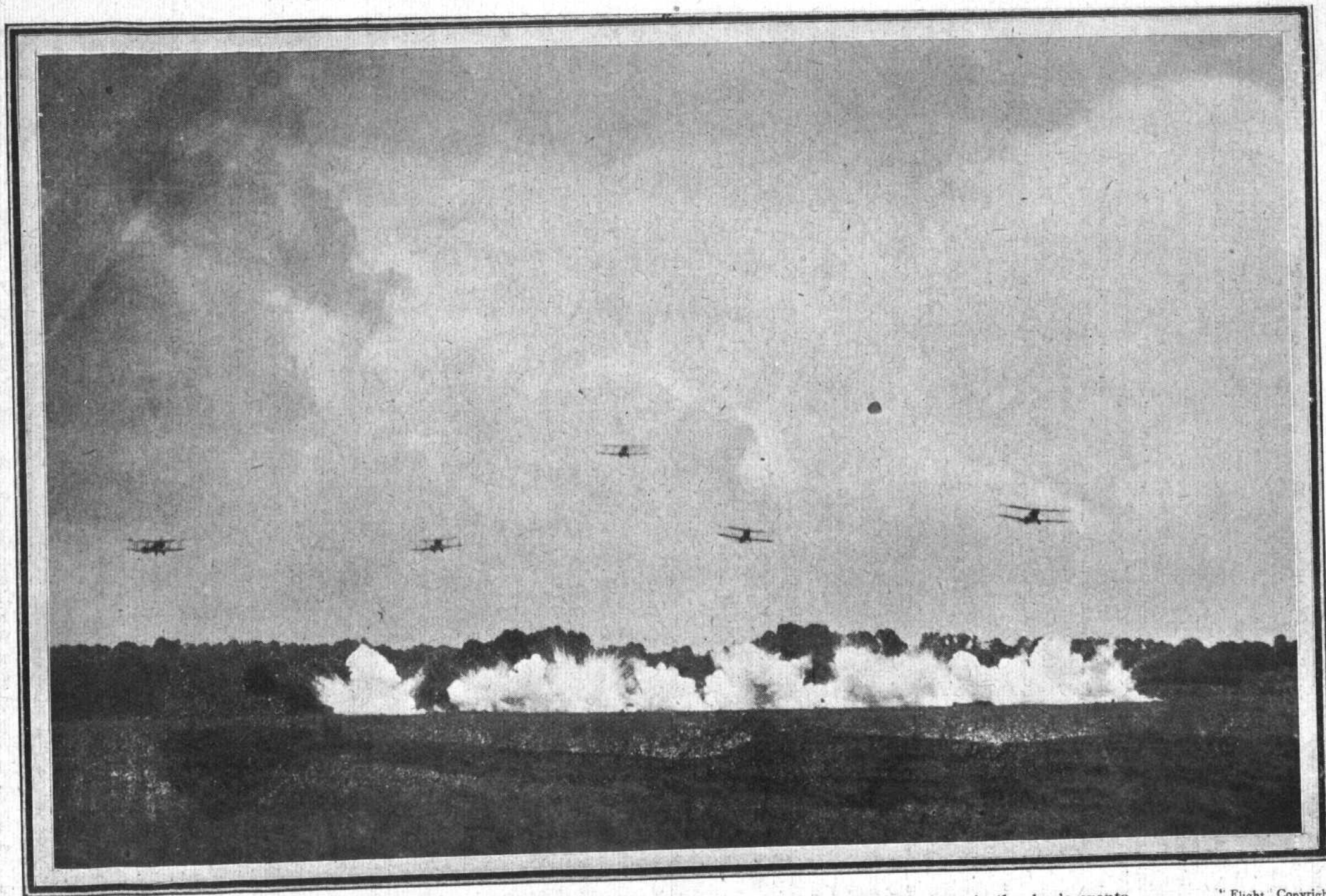
All this sounds quite formidable, until we come to discover that the total amount expended by the Department during the past financial year was no more than £119,081. Of this, £24,366 was absorbed in the payment of the staff at headquarters, and £57,043 by the preparation of the Cape-Cairo air route. This leaves £27,572 for the encouragement and assistance of civil aviation! Truly this is real economy! If only the rest of the Government Departments would take example by the Department of Civil Aviation we should see an end of inflated Estimates and should before long be able to look forward with some certainty to a reduction of the present crushing burden of taxation.

It is, however, economy at the wrong end. We are almost tired of pointing out that want of preparation nearly lost us the war and that as a consequence of "economy" on the part of successive Governments we were forced into a war for which we had made no provision and which cost us a million lives and £8,000,000,000 in money. If we had had a million trained men in July, 1914, and a Government which would have told Germany plainly that we should use them there would have been no war at all, or if the arch-Hun had insisted on fighting it would have all been over in a year at most. In consequence of being as we were the War lasted for 4½ years, and cost us at least four times as much in blood and treasure as it would have done if we had not been so "economical" in previous years. Even in spite of the patent lesson to be learnt from our experience in the late War, the Government seems willing to squander money lavishly for any and every purpose save that of being prepared against another *dies iræ*. Every authority is agreed that the next act of aggression will come from the air. Practically everybody who counts, except perhaps the Chief of the Air Staff, agrees that the best method of preparing against the aerial blow is by the encouragement of civil aviation and the consequent provision of numbers of skilled pilots and mechanics and a correspondingly large number of efficient machines, capable of being converted at short notice to the purposes of war. Yet in twelve months all the money this country is able to spend on civil flying is a mere £27,000. It is a policy of penny wise and pound foolish.

Others More Far-seeing

Other countries appear to see the future with clearer vision. Germany in particular seems to be determined to leave no stone unturned to develop commercial flying as soon as Treaty restrictions allow her to begin in earnest. France and Italy are paying a great deal of attention to the subject.

JULY 8, 1920



R.A.F. PAGEANT : Five Bristol Fighters trench bombing ; a marvellously realistic item in the day's events

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The last-named spent no less a sum than £66,000 in sending an aviation mission to the Argentine, in addition to running expenses of £3,900 a month. Yet Italy is supposed to be nearer national bankruptcy than any other of the Allied nations. In America a great deal of attention is being paid to the development of aerial mail services, which are being operated with marked success on several routes. This is thanks to the wisdom of the United States postal authorities, who seem to be far more alive to the commercial possibilities of the aeroplane and the airship than are our own.

Wherever we look, whether to foreign countries or to our own Dominions, we see that all are looking ahead to the future development of aviation, and are doing their best to ensure that that development shall proceed as rapidly and smoothly as possible, nor are they grudging money to ensure this result. Only in England does the old conservative idea continue to prevail, that it is against all public policy for the Government to give direct assistance to private enterprise, even when that enterprise is bound up so closely as is civil aviation with the future defence of the Empire.

Cheaper Air Mails

The new air mail service to Holland began this week, and is to be continued with a single daily service each way, Sundays excepted. We are very pleased to see that the postal rates have been fixed at 3d. per oz. and that unrestricted facilities for posting are to be afforded. Express air mail packets for Amsterdam and Rotterdam should be delivered on the same day they are posted here, and non-express packets for these places and for the rest of Holland by the first post next morning. As letters sent by the night mail from London are not delivered anywhere in Holland until the following afternoon or evening, the air mail will normally be quicker by the greater part of a business day, and by the use of the air mail in both directions it will be possible for a business house in the City or West End of London to obtain a reply from Amsterdam in about thirty hours. Air mail letters from Holland will normally be delivered in many of the large provincial towns by the first post on the morning after despatch from Amsterdam. The fees are: (1) Ordinary postage and registration fee, where payable; (2) an air mail fee of 3d. per oz.; (3) an express fee of 6d. per packet where express delivery is required.

These charges are much nearer the mark than the absurd fees levied in the case of the London-Paris

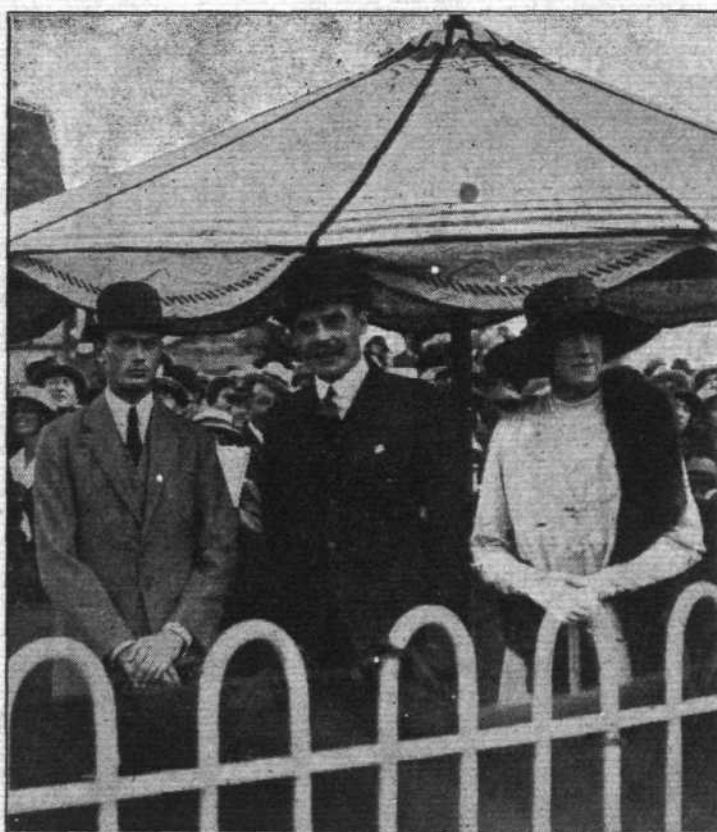
service, which have done a great deal to minimise the value of the quicker communications. Incidentally, it is announced that an early and substantial reduction of these fees is in contemplation. The sooner this comes to pass the better, since the present scale is absolutely grotesque. The service would pay well on the scale laid down for the Dutch service, and as the latter entails a much greater mileage there seems to be no justification for continuing the high London-Paris rates for a moment longer.

Now that the Post Office has at last realised that air mail services can actually be conducted with regularity and at a reasonable rate per letter, and still make a commercial profit, it seems to us that the time has come when it must take steps to compel its services to pay their way. It may be said that we do not think there is the slightest ground for

thinking that the Dutch service will not make a profit, even if nothing is done more than has so far been announced, except perhaps bold advertisement. The business community is quick to realise the value of rapid transit, and there is little doubt that full advantage should be taken of the facilities afforded by the new service. But if the Post Office is serious in its intention to develop aerial services it will have to go farther than it has gone at present. What it will have to do is to force all first-class mail matter into the air. When that happens there will be no more talk about subsidies to the carrying or constructional companies.

There are still some who look askance at aerial transit and fear loss and delay. The answer to that is that the London-Paris ser-

visee has not lost a letter or a package and that it has kept time quite as well as the train and boat service. Time was when our great-grandfathers regarded railway transport in the same way, yet the postal authorities of the day sent the mails by train and said nothing about it. We are absolutely confident that in the case of the cross-Channel services it would pay the Post Office to send all first-class mail matter by air at ordinary postal rates. The question of paying is entirely dependent on load. At present the mail matter sent to France amounts to about 15 tons daily, of which a large proportion is "first-class." Never mind about making announcements or charging special fees. Simply send "first-class" matter by aeroplane and the service will pay handsomely. One day the public will awake to the knowledge that for a considerable time their letters to and from France have been carried by air and then air mail services will have been made for ever.

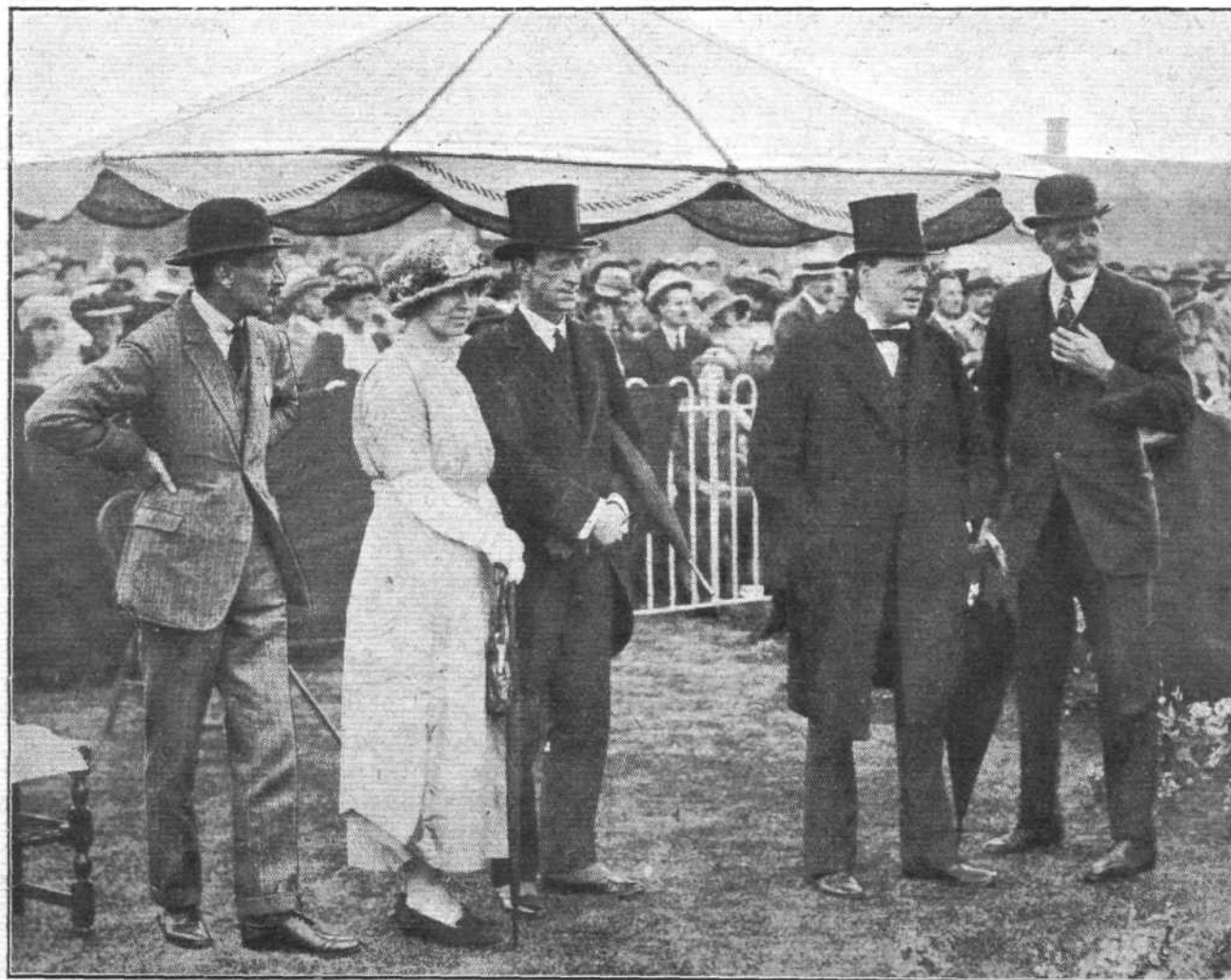


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R.A.F. PAGEANT: H.R.H. the Prince Henry, attended by General G. D. Jeffreys, G.O.C. London District, is keenly interested in the pageant items



AVIATION has never had such a day as it experienced last Saturday on the occasion of the Royal Air Force Aerial Pageant, which was held at Hendon, in aid of the R.A.F. Memorial Fund. Never has it had such enthusiastic support from the public, either. Although there were many other sporting events being held elsewhere, Hendon appeared to be the main attraction. From noon until well into the afternoon people in their thousands swarmed Hendonwards from all directions—how they got to the aerodrome is a marvel in itself. At Golders Green, for instance, the queue for the motor-buses grew so rapidly that—in spite of the fact that groups of four or more buses at a time were hurriedly and continuously requisitioned from other services—it very nearly tied itself into a knot such that the cleverest of Boy Scouts would have failed to unravel! And,

in addition no small proportion of the people from this station alone wisely ignored all means of transport, and decided right away to walk to Hendon and save time. All other routes to Hendon were, we understand, similarly afflicted. As for those who came in cars—including Mr. Winston Churchill—many of these had to join up on foot with personally conducted parties to the aerodrome, as the solid block at the finish rendered any chance of getting there by any other means quite hopeless. Under these circumstances, therefore, it was not long before the enclosures at the aerodrome were well packed. It is stated that the number of spectators that paid at the gates was 40,000 or over—in *our* opinion, decidedly over. In addition to this number must be counted the thousands who thronged the neighbouring hills and country—as far as Hampstead. The latter



AT THE R.A.F. PAGEANT: Left to right, the organiser, Air Vice-Marshal Sir J. M. Salmond, K.C.B., C.V.O., D.S.O., Major-Gen. Sir F. H. Sykes, G.B.E., K.C.B., C.M.G., Lady Sykes, the War Secretary, Right Hon. Winston S. Churchill, M.P., and Air Marshal Sir Hugh Trenchard, Bart., K.C.B.

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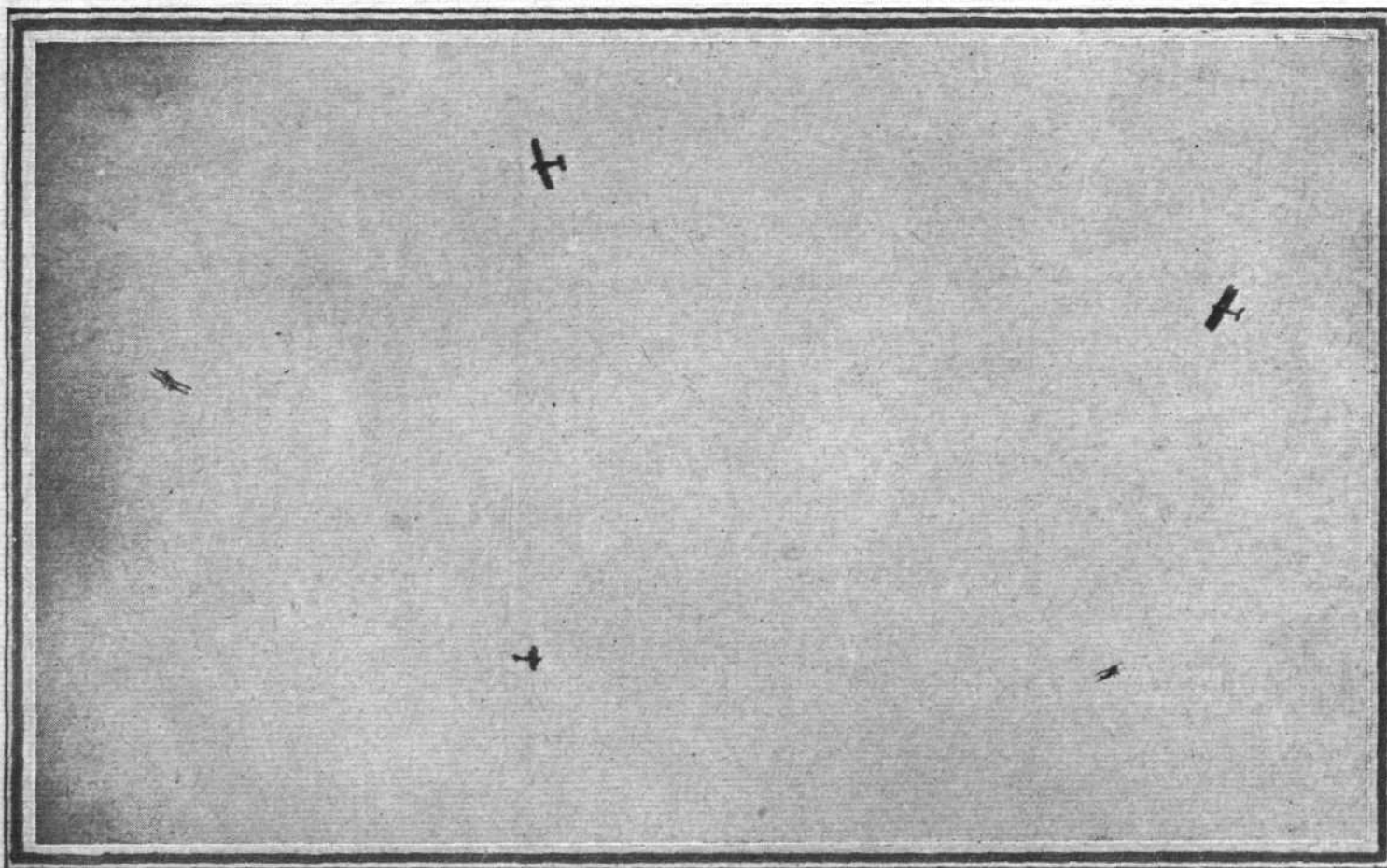
R.A.F. PAGEANT : A small batch of the machines ready for the day's stunts

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fact may not be satisfactory from the point of view of the R.A.F. Memorial Fund, but there is one point in its favour—it indicated that public interest in flying is by no means dead, but is considerably increasing. In fact, it is our opinion that last Saturday marks the turning point in Civil Aviation, and that from now onwards progress will trend steadily forward.

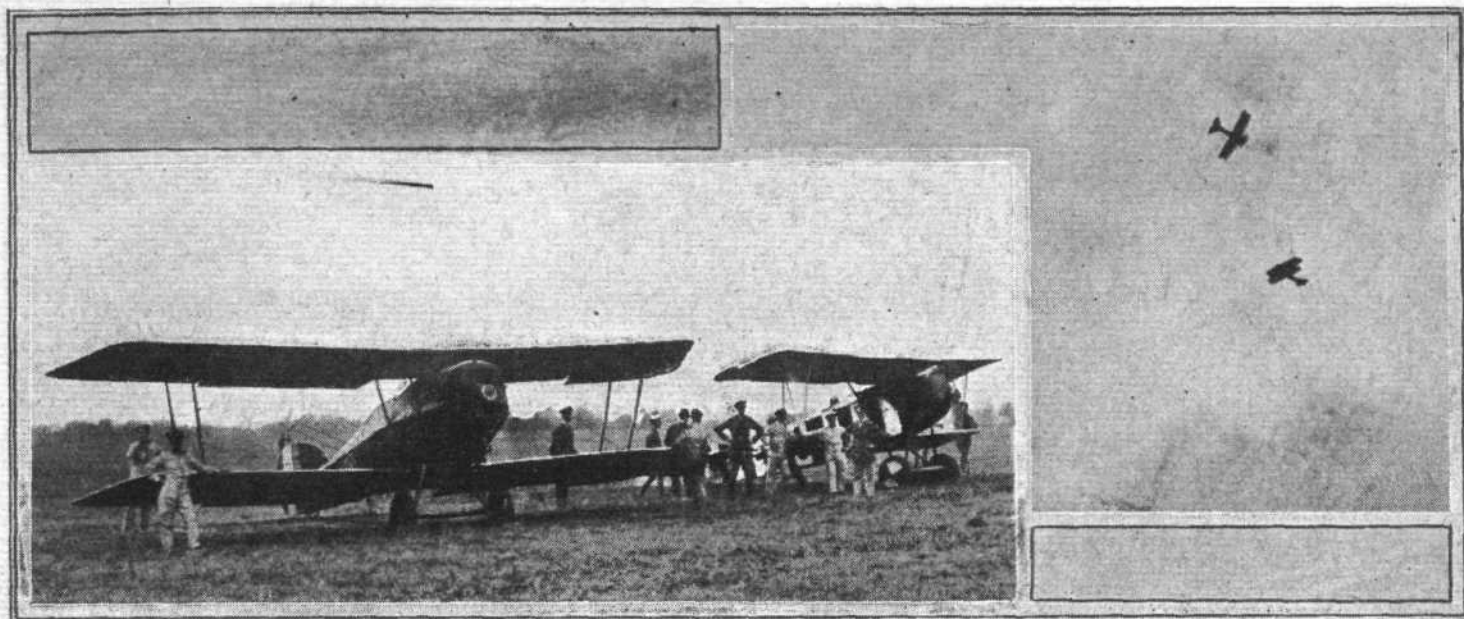
As regards the Pageant itself, this was an unqualified success in every way, and as an example of organisation put past demonstrations utterly in the shade, and is a model for future

ones. As it was the programme, an ambitious one at that, was carried out without a single hitch, and well to schedule—the only event scratched being the arrival of H.M. Airship R34, and NS7—but then the cake was so rich with choice plums that we did not miss the icing very much. As we found the greatest difficulty in moving about, it was impossible to ascertain who-was-who in the notability line present, but amongst the many that must have been there may be mentioned H.R.H. Prince Henry, Sir J. M. Salmond, Sir Hugh Trenchard, Sir F. H. and Lady Sykes, Mr. Winston



R.A.F. PAGEANT : Event No. 4. A quintette of Bristol Fighters flying in formation "round the mulberry bush"

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R.A.F. PAGEANT : Event No. 2. A Martinsyde and a Fokker about to take off for a "scrap," and on the right, the pair in the thick of the fight above the aerodrome

Churchill, and the rest of the people included in "Who's Who." We also noticed many old friends, but never managed to get further than seeing them.

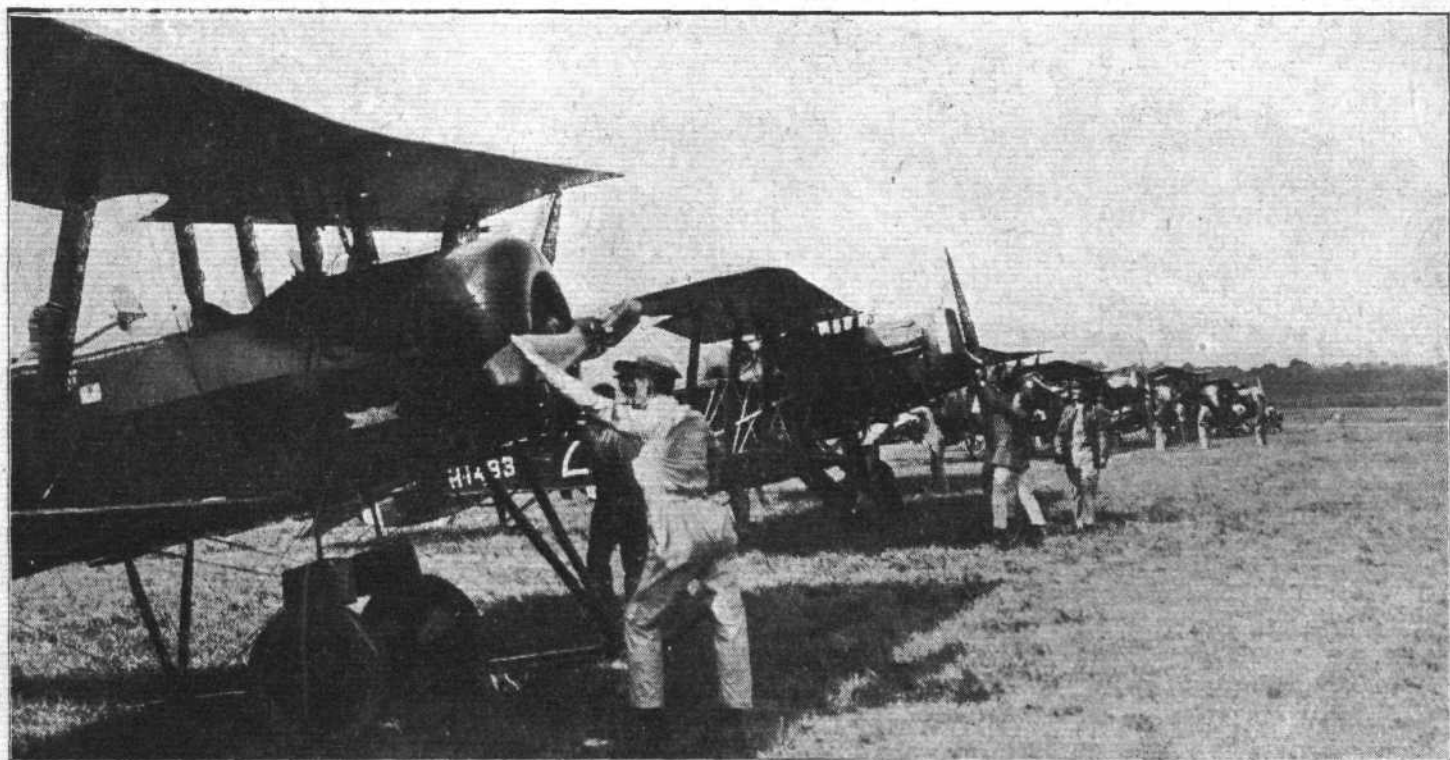
The weather, though threatening, was ideal, the magnificent thunderstorm-like clouds adding considerably to the spectacular effect. Only twice did we have the slightest of showers.

At 3 o'clock sharp the first event, a cross-country race between six Standard Avros, was started under somewhat novel conditions. The machines were lined up (owing to the direction of the wind, facing the enclosures) with their respective pilots and mechanics 20 yards behind them. At the signal to start the latter dashed to their posts, and were away as quickly as they could. Flight-Lieut. Weare, M.C. (with 14 Huns to his credit), got going very smartly, followed a little later by the others in rapid succession. The competitors flew out towards the Edgware Road, turned, and then made for a second turning point in the direction of Bittacy Hill—good old Bittacy Hill!—and thence home. Flight-Lieut. Weare maintained his lead throughout, and Flight Officer W. A. K. Dalzell was, we believe, a good second.

Next came a realistic aerial combat between Flight-Lieut. F. T. Williams, M.B.E. (3 Huns), on a Martinsyde, and Flight-Lieut. W. H. Longton, D.F.C., A.F.C. (16 Huns, 1 balloon), on a Fokker D.VII. These two executed every possible kind of manoeuvre to obtain a position of advantage over the other, to the accompaniment of frequent papapaps from their machine guns, and we must say that the "Hun" certainly put up a magnificent "defence." Flight-Lieut. Noakes, A.F.C., M.M. (3 Huns), then indulged in one of the finest exhibitions of stunt flying on a S.E.5B we have ever had the pleasure of seeing. All the tricks imaginable he performed, and his ceiling was never more than 1,000 ft. His horizontal loops were wonderful.

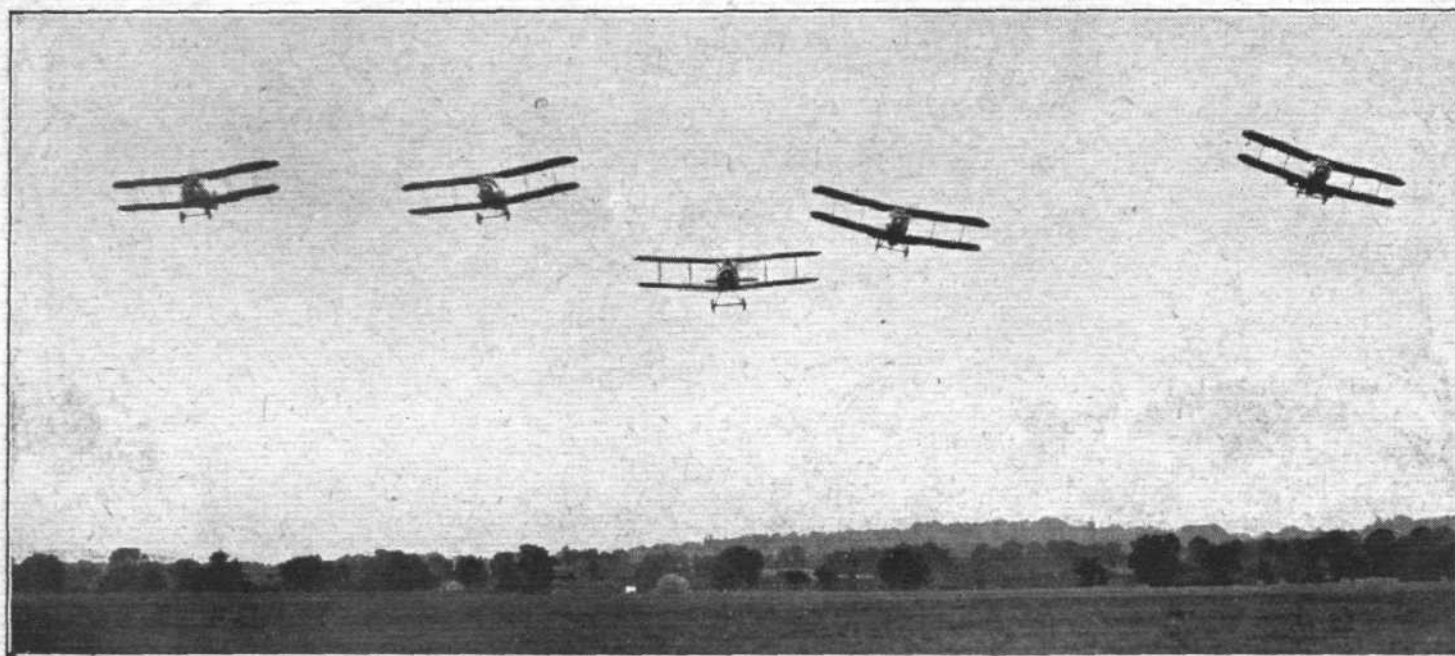
In the meantime a very fine show was being carried out on the ground, opposite the enclosures, by a latest type standard 5-seater Avro Mark Heath Robinson biplane. This machine is the last word (others fail us) in design. It is fitted with an extra large 4-speed and reverse gear box, a vacuum cleaner, anchor, flue-pipe, and jazz-interplane struts. It was painted in the latest camelflage colours to keep the flies off.

Event No. 4, a display of formation flying and air drill,



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R.A.F. PAGEANT : Line up of machines for the Relay Race



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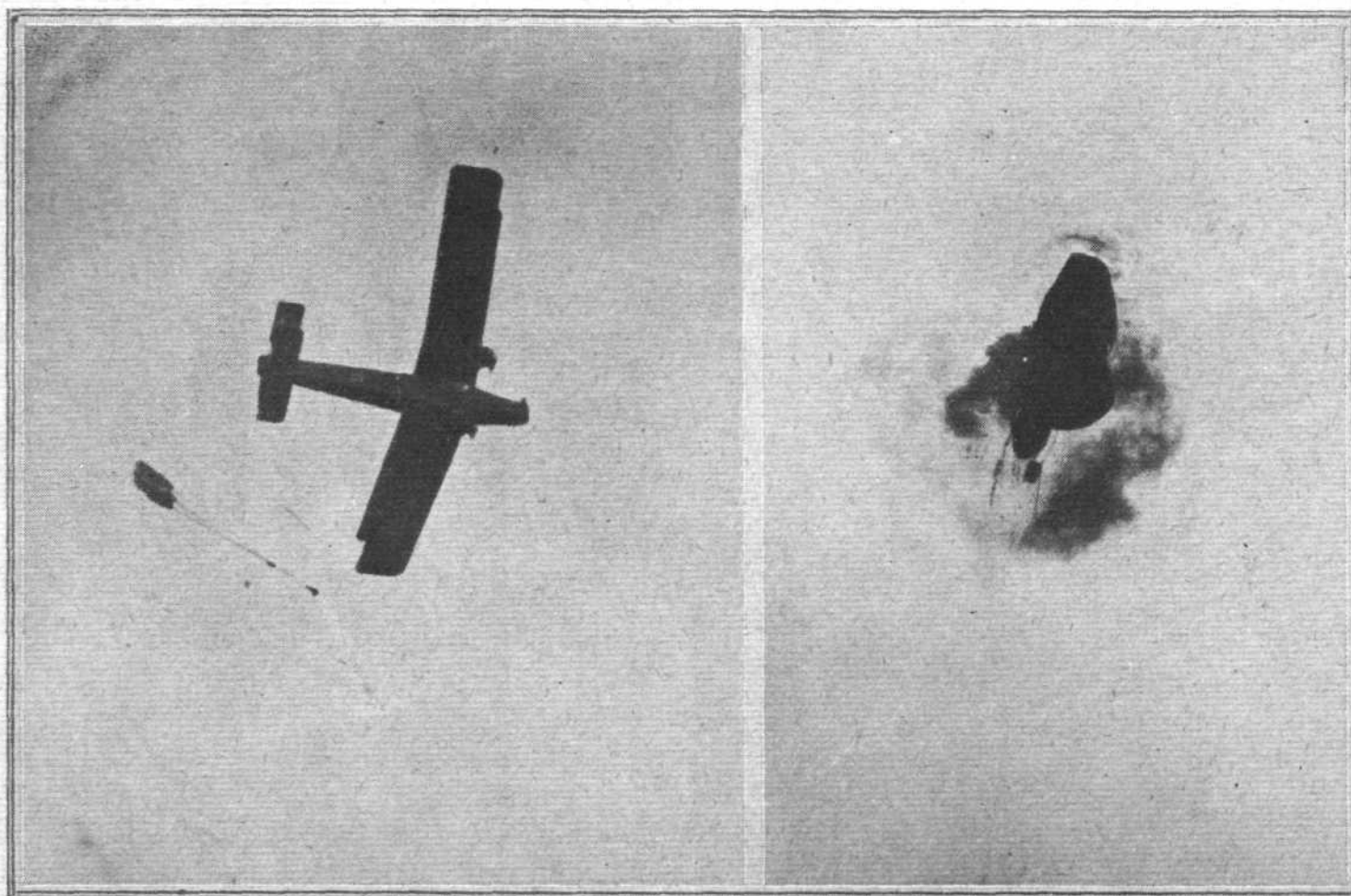
R.A.F. PAGEANT : A batch of Snipes give an exhibition of "aerobatics," in formation

by five Bristol Fighters, was very much appreciated by the spectators. It certainly was a most imposing display—especially the get-off, all five machines abreast and no more than a machine's span apart, zooming over the enclosures. Their prettiest turn was, perhaps, flying in a perfect circle each machine very evenly spaced.

The Bristol Fighters were followed by five Sopwith Snipes, and they put up an even more remarkable performance. In addition to the usual formation evolutions, they executed

the most astonishing aerobatics, all in perfect unison. First they would advance in line, and then all suddenly loop and continue forward. Then quickly right-about-turn, and form in single file, simultaneously loop, and so on *ad lib.* ! They, also, played, "Here we go round," only in much smaller and ever descending circles.

Next followed another wonderful display of stunt flying, this time by Flight-Lieut. Longton on a Sopwith Camel. Whilst most of the stunts performed by Lieut. Noakes on the



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R.A.F. PAGEANT : A couple of "set pieces" of the day. On the left Miss Sylva Boyden leaving the Handley Page machine in the "Guardian Angel" parachute. On the right, the kite balloon collapsing in flames after the attack by Flight Lieut. T. F. Hazell, D.S.O., M.C., D.F.C.

S.E. 5B were of a rapid character, Flight-Lieut. Longton appeared to specialise in slow loops, slow rolls, slow spins and slow everything—which made the display quite interesting. He also executed the best upside down flights we have seen, which formed a remarkable comparison to those made many years ago by the late B. C. Hucks. He remained upside down for quite several minutes, and travelled a considerable distance without dropping to any appreciable extent.



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R.A.F. PAGEANT : Miss Sylva Boyden, the famous parachutist, and her "bag of tricks," tries to evade "portraiture"

When this exhibition of stunting concluded, the spectators stirred themselves perceptibly as three of the huge four-engined super Handley Page bombers charged the enclosures and zoomed with a tremendous roar over their heads, followed by sundry small fry in the shape of Sopwith Snipes, a Nieuport Night-Hawk, etc. These machines, large and small, manœuvred over the aerodrome for some time, and presented a most interesting and somewhat amusing contrast. The Nieuport executed several loops and other stunts round one of the Handley Pages, whilst a Snipe "worried" the others, dodging from one to the other.

As one of the Handley Pages approached over the enclosure, Miss Sylva Boyden, with knees tucked well under her chin, dived head-first from her seat near the tail, followed by a red and white Guardian Angel parachute, which opened



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R.A.F. PAGEANT : Event No. 2. Flight Lieut. W. H. Longton, D.F.C., A.F.C., on the Fokker Fighter, and his Charlie Chaplin mascot

with its usual exceptional quickness and brought the diver swaying violently, but gracefully, to the ground a few hundred yards from the enclosure. After releasing herself from the harness and gathering in the parachute, Miss Boyden, who is but 21, and pretty at that, there and then celebrated her thirteenth descent, in true aviator's style, with a cigarette, and then faced the ordeal of being photographed and filmed.

The next event on the programme was another aerial combat between Flight-Lieut. K. M. St. C. G. Leask, M.C. (16 Hun aeroplanes, 2 balloons), on a Bristol Fighter, and Flight-Lieut. A. Coningham, D.S.O., M.C., D.F.C. (25 Huns), and Flying Officer C. E. Gibbs, M.C. (12 Huns), both on Sopwith Snipes. This display was very exciting to watch, making one to realise what skill and daring our pilots must have possessed to have achieved what they did during the War. Time and again the Bristol was hard pressed by both Snipes at once, but by a clever evolution managed to slip out.



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R.A.F. PAGEANT : The Heath Robinson-Avro biplane, funnel, anchor, jazz struts and all, which was such a taxiing feature for the crowd. The "Skipper" is just changing into top gear

The second race of the day then took place. This was a relay race, for a cup presented by Viscount Northcliffe, competed for by teams of three pilots and machines, representing Uxbridge, Kenley, Andover, Netheravon, Upavon, Duxford, and Gosport. The three machines of each team were an Avro, a Bristol Fighter, and a Sopwith Snipe. The Avros got away first, and flew the same course as before,

sort of "jerk"—the machine coming to normal attitude quite suddenly and evenly.

After Hawker's much appreciated "turn" came the event of the day—the strafing of Herr Von Rupert. Rupert, an obsolete kite balloon, had been dozing peacefully for the greater part of the afternoon amongst the long grass at the far end of the aerodrome. But now he rose, shivered with

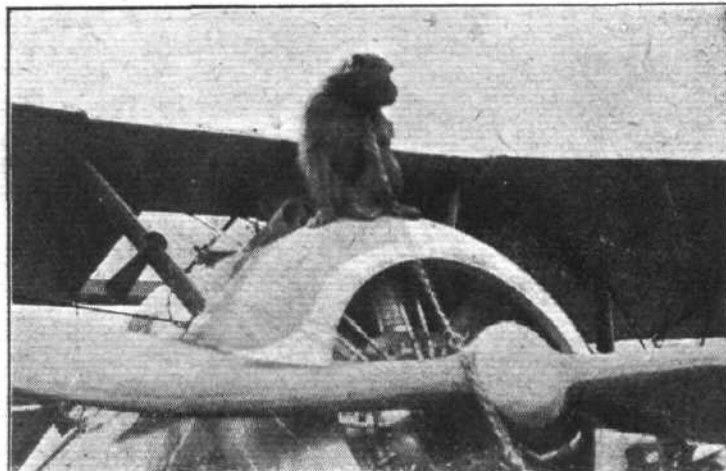


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R.A.F. PAGEANT : Mr. H. G. Hawker is leisurely inclined

landed behind their respective teams, each Avro pilot handing a message to the pilot of the Bristol, who then got away and flew over the same course. On landing the pilot of each Bristol handed the message to the Snipe pilot of his team, who in turn got away and completed the last lap of the same course. This race produced some very fine piloting, and plenty of excitement, and the Kenley team (consisting of Flight-Lieut. T. E. Salt, A.F.C. (3 Huns), Avro; Flying Officer F.L. Luxmore (4 Huns), Bristol; and Flight-Lieut. R. W. Chappell, M.C. (18 Huns), Snipe) proved an easy winner.

A mere civilian then gave an excellent exhibition of stunt flying. Our old friend, Harry Hawker, ascended on the



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R.A.F. PAGEANT : The R.A.F. mascot views the proceedings from a Snipe

fright and shook his ears angrily at being disturbed. However, after making his way ponderously towards the centre of the aerodrome, he made a good get off, with his tail well up. Flight-Lieut. Hazell, D.S.O., M.C., D.F.C. (34 Huns, 16 balloons) on a Sopwith Snipe, had been waiting up aloft the meanwhile, and as soon as Rupert got well up, he made three successive swoops on the latter, discharging a burst of the latest pattern invisible incendiary bullets each time. Presently smoke was seen to issue from Rupert's starboard side, followed almost immediately by a burst of red and yellow flame, and volumes of dense black smoke. As Rupert,



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R.A.F. PAGEANT : Hendon redivivus. A corner of one of the crowded enclosures

pretty Sopwith Swallow parasol monoplane—the only mono. on the day's active list—and executed many extraordinary evolutions. They seemed quite different from the others we had been witnessing previously—but what the exact difference was we cannot well define. For one thing, Hawker had a peculiar way of terminating each loop, roll, or spin with a

now a mass of flame and smoke, fell earthwards, the "observer," with parachute, also decided to return home, and an exciting race ensued. It ended in a "dead heat."

The next event was another very realistic representation of aerial warfare. A formation of five Bristol Fighters, flying in line, dived to about 300 ft. towards some "trenches,"

firing rounds from their machine guns at the same time. When over the trenches (about!) the Bristols "let go" their bombs—which dropped so fast we could not see them fall—and up went the trench and away flew the Bristols. It was a very impressive display.

By way of a finale, we were given a sort of aerial firework display; first of all a Handley Page discharged three artificial-cloud producing bombs, the resulting effects of which were really beautiful and convincing. Then some 1,300 small incendiary bombs were dropped from about 1,000 ft. These burst into bright white flames on striking the ground,

and remained burning for some time. They, also, were very convincing! Yes, these last few events made many think pretty hard on the matter of the next aerial war. After this there was a general activity on the part of both man and machine. Bristols, Sopwiths, Handley Pages, and spectators, all made preparations for returning home. The least thing we saw was the Avro Mark Heath Robinson well up in the air—smoke, funnel, anchor, shirt and all!

The least said about getting home the better—it was such a delightful and successful pageant that we would rather not mar it by less pleasant thoughts.

The Royal Aero Club of the United Kingdom

OFFICIAL NOTICES TO MEMBERS

FIRST RACE MEETING, 1920

THE AERIAL DERBY

(Under the Competition Rules of the Royal Aero Club and the Regulations of the Fédération Aéronautique Internationale)

AT THE

LONDON AERODROME, HENDON, N.W.

(By arrangement with the Grahame-White Co., Ltd.),

ON

SATURDAY, JULY 24, 1920, at 3.30 p.m.

PRIZES

The following Cash Prizes will be presented by the Royal Aero Club:—

Fastest Time (Winner of the Aerial Derby) £500

Handicap:—1st Prize £250

2nd Prize £100

3rd Prize £50

REGULATIONS

QUALIFICATION OF COMPETITORS.—The Competition is open to persons of any nationality holding a licence issued by any Aero Club affiliated with the Fédération Aéronautique Internationale.

ORGANISATION.—The Competition shall be conducted by the Royal Aero Club under the Competition Rules of the Royal Aero Club and the Regulations of the Fédération Aéronautique Internationale.

COURSE.—The Course is approximately 200 miles, and will consist of a double circuit of London, starting from the London Aerodrome, Hendon, with the following turning points:—

Brooklands Aerodrome, Weybridge.

Epsom.

West Thurrock.

Epping.

Hertford.

ENTRIES.—THE ENTRY FEE IS £10. THIS FEE, TOGETHER WITH THE ENTRY FORM, MUST BE RECEIVED BY THE ROYAL AERO CLUB, 3, CLIFFORD STREET, LONDON, W.1, NOT LATER THAN 12 NOON ON WEDNESDAY, JULY 14, 1920.

The following entries have been received:—

Entrant.	Pilot.	Machine.	Engine.
A. V. Roe and Co., Ltd.	Capt. H. A. Hamersley, M.C.	Avro Baby	35 h.p. Green
Bert Hinkler .. Squad. Leader	Bert Hinkler Squad. Leader	Avro Baby Martinsyde	35 h.p. Green 260-275 h.p.
T. O'B. Hubbard, M.C.	T. O'B. Hubbard, M.C.	F.4	Falcon-Rolls-Royce
Martinsyde, Ltd.	F. P. Raynham	Martinsyde Semi-Quaver	300 h.p. Hispano-Suiza
The "Nieuport" and General Aircraft Co., Ltd.	L. R. Tait-Cox	Nieuport Single-Seater Biplane	320 h.p. A.B.C. Dragonfly
The "Nieuport" and General Aircraft Co., Ltd.	John Herbert James	Nieuport Single-Seater Biplane	320 h.p. A.B.C. Dragonfly

Offices: THE ROYAL AERO CLUB,

3, CLIFFORD STREET, LONDON, W. 1.

H. E. PERRIN, Secretary.

ENGLAND-HOLLAND AIR MAIL

An announcement by the Postmaster-General set forth that from Monday last there would be a daily dispatch of mails by aeroplane (Sundays excepted) between London and Amsterdam, but unfortunately Monday was the first really bad day for long-distance over-sea flying, and in consequence the flight had to be countermanded. The air mail fee has been fixed at the low rate of 3d. per ounce, over the ordinary letter rate of 2½d. per oz., and unrestricted facilities for posting will be afforded.

The contract for the carriage of the mails by air to Holland has been secured by Messrs. Handley Page, Ltd., and it is stated that the directors tendered at a rate which would have enabled the Postmaster-General to fix 1d. an ounce as the excess rate for the conveyance of letters by aerial mail. Unfortunately, and to the great regret of the Postmaster-General, the Dutch Government could not see their way to agree to a lower charge than 3d., which is now the official rate.

There are to be two classes of aerial mails to Holland,

namely, those carried for express delivery and the mails for delivery by the ordinary post. The express service will ensure the delivery of letters by the Dutch postal authorities immediately on their arrival at the Dutch aerodrome, and *vice versa*. The ordinary service means that letters posted at the General Post Office before 3 p.m. any day will be delivered anywhere in Holland by the first post on the following morning. Letters for the express service will be accepted by any Post Office. Letters for conveyance by the ordinary service may be posted in the public letter boxes as usual.

The journey to Holland will occupy three hours, and passenger rates have been fixed at 15 guineas single, and £31 10s. return. The rates of freight by the aerial mail service have been fixed as follows:—Shipments up to 10 lbs. in weight, 2s. 6d. per pound; from 10 lbs. to 20 lbs., 2s. 3d. per pound; 20 lbs. to 50 lbs., 2s.; 50 lbs. to 100 lbs., 1s. 9d.; 100 lbs. and over, 1s. 6d. per pound. Passengers' luggage, unaccompanied by passengers, will be charged for at the rate of 1s. 6d. per pound, minimum freight 5s.

London-Brussels Postal Service

It is understood that the contract for the conveyance of the Royal Mails by air service between London and Brussels has been given to Handley Page Transport, Ltd. The postal rates have not yet been definitely fixed, but it is stated that they will be less than those for the service to Holland.

London-Paris Rates to be Reduced

ONE result of the reasonable rates which are being charged for the carriage of mails by air to Holland and Belgium is that early and substantial reduction of the fees for the Paris service is in contemplation. This is good news to those who believe in air mails.

THE OLYMPIA AERO

Characteristics and Performances



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2.



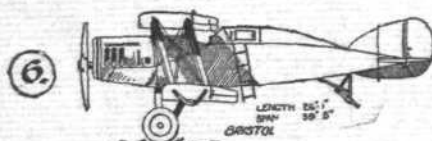
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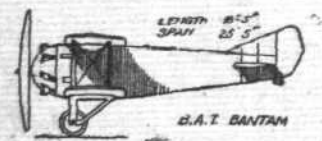
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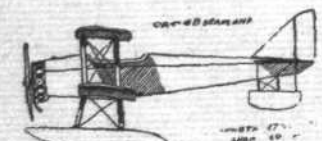
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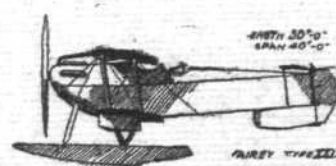
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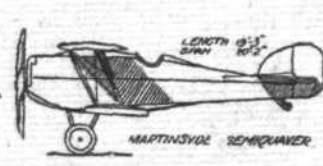
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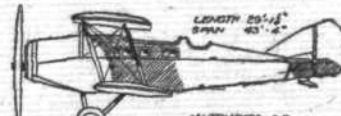
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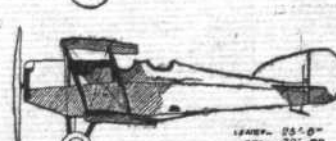
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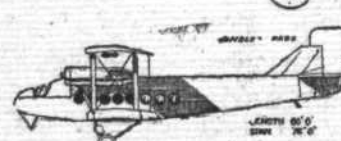
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	Make	Name or Series No.	Type.	Engine			No. of Passengers
				No.	Make	h.p.	
1	Austin	Whippet ..	B	1	Anzani ..	45-50	0
2	Beardmore ..	W.B.2 ..	B	1	Beardmore	160 or 200	1
3	Beardmore ..	W.B.10 ..	B	1	Beardmore	160 or 200	1
4	Blackburn ..	Swift ..	B	1	Napier ..	450	0
5	Bristol	Pullman ..	T	4	—	400	14
6	Bristol	Tourer ..	B	1	Siddeley "Puma"	240	2
7	B.A.T.	Bantam ..	B	1	A.B.C. Wasp II	200	0
8	B.A.T.	Commercial	B	1	R.R. Eagle VIII	350	4
9	Central Aircraft Co.	Centaur 4B.	B	1	Anzani ..	100	2
10	Fairey	XXI ..	B	1	Napier "Lion"	450	0
11	Martinsyde ..	A.11 ..	B	1	Hispano-Suiza	300	4
12	Martinsyde ..	F.4 A ..	B	1	Hispano-Suiza	300	1
13	Martinsyde ..	"Semi-quaver"	B	1	Hispano-Suiza	300	0
14	Handley Page ..	W.8 ..	B	2	Napier "Lion"	450	15
15	H. Potez	VIII ..	B	1	H. Potez ..	50	1
16	Avro	Baby ..	B	1	Green ..	35	0
17	Avro	547-A ..	T	1	Siddeley "Puma"	240	4
18	Avro	548 ..	B	1	Renault ..	80	2
19	Short	Sporting Seaplane	B	1	Beardmore ..	160	3
20	Short	Swallow All-Metal	B	1	Siddeley "Puma"	240	0
21	Sopwith	Dove ..	B	1	Le Rhone ..	80	1
22	Sopwith	Gnu ..	B	1	Le Rhone ..	110	2
23	Sopwith	Antelope ..	B	1	Hispano-Suiza	180	2
24	Supermarine ..	Sea-King ..	B	1	Beardmore ..	160	0
25	Supermarine ..	Channel ..	F.B.	1	Beardmore ..	160	3
26	Vickers	Vimy-Commercial	F.B.	2	R.R. Eagle VIII	360	10
27	Vickers	Viking ..	B	1	R.R. Eagle VIII	360	4
28	Westland	Limousine ..	F.B.	1	Hispano-Suiza	300	3

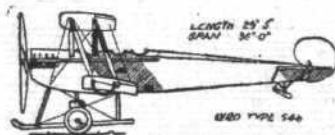
SHOW AT A GLANCE

of the Machines Exhibited

Climb	Duration (hours)	Speed	Weight (lbs.)		Length	Span	Height	Area	Load/h.p.	Load/sq.ft.
			Empty	Loaded						
ft./mins.		m.p.h.			ft. in.	ft. in.	ft. in.	sq. ft.		
5,000/9	2	35-95	580	810	16 3	21 6	7 6	134	16.2	6
5,000/10	3.5	55-107	1,751	2,516	27 7	35 0	10 11	354	15.7	7.1
5,000/7	3	55-116	1,751	2,516	27 7	35 0	10 11	354	12.6	7.1
5,000/9	6	40-91	1,852	2,849	26 0	46 0	11 10	509	17.8	5.6
5,000/6	4.5	40-97	1,852	2,849	26 0	46 0	11 10	509	14.2	5.6
850/1	4	49-112	3,100	6,000	35 6	48 6	12 0	720	13.3	8.3
5,000/5	5	55-125	11,000	17,750	52 0	81 8	20 0	1,905	10.8	9.3
10,000/13	7	48-115	1,900	3,120	26 1	39 5	9 6	405	13.5	7.7
15,000/13.6	3.5	45-150	953	1,618	18 5	25 0	6 9	185	8.1	8.75
5,000/4	6	50-128	2,700	4,500	34 8	46 0	11 3	580	13	7.7
1,000/2.6	3	40-75	1,230	1,900	27 1	39 1	11 4	380	18.7	4.9
—	—	—	—	—	30 0	40 0	—	—	—	—
—	5	40-115	—	4,000	29 1	43 4	10 6	519	13.3	7.7
—	2.5	44-142	—	2,300	25 6	32 9	8 10	328.5	7.5	7.0
—	—	160	—	2,025	19 3	20 2	7 3	302	13.8	6.7
—	6.5	48-112	—	—	60 0	75 0	17 0	—	—	—
—	3	32-75	483	925	18 7	26 5	8 2	204	18.5	4.55
5,000/15	4.3	35-80	615	870	19 3	25 0	7 6	176.5	21.7	4.9
5,000/7.6	4.5	45-100	2,080	3,286	29 10	37 0	14 5	498	13.7	6.6
5,000/15.5	2.5	40-80	1,338	1,943	29 5	36 0	10 5	330	24.3	5.8
—	3	83	2,095	3,100	33 0	44 0	12 0	500	15.5	6.2
10,000/11	3-5	120	1,865	2,670	26 5	37 6	10 6	370	10.2	7.2
5,000/7.5	2.5	35-100	850	1,430	19 6	25 0	9 6	213.4	17.8	6.7
5,000/7.75	3	40-93	1,350	2,160	25 6	38 0	10 0	354	10.6	6.1
5,000/7.5	4	38-100	2,100	3,000	36 6	46 6	11 0	550	16.6	5.4
10,000/20	3	58-103	—	—	26 9	35 0	11 6	—	—	—
—	3.75	53-80	—	3,400	30 0	50 3	13 0	453	21.2	7.5
6,000/17	5	45-100	7,300	12,500	42 8	67 0	15 3	1,330	17.8	9.3
6,000/11	4	45-110	2,740	4,545	32 0	46 0	13 0	505	12.6	9
—	4.5	115	—	3,800	28 6	38 2	10 9	435	12.65	8.7



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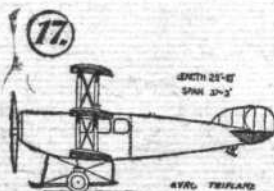
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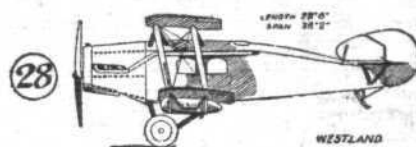
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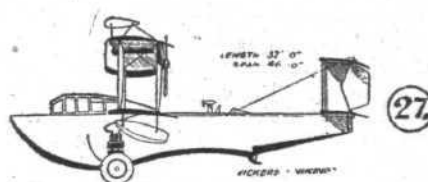
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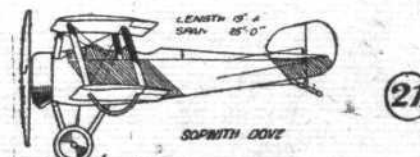
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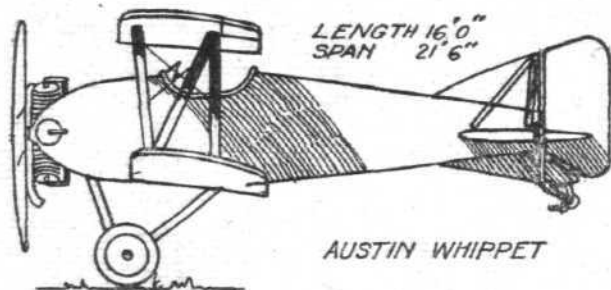
The OLYMPIA 1920 AERO SHOW

THE MACHINES

WHILE it may be true to say that there will not be many machines of really new design on view at Olympia, the show will afford visitors their first opportunity of studying at close range the details of a number of machines which have proved their efficiency and suitability for useful commercial work. Two outstanding impressions will be the increasing vogue of enclosed cabins and the continued progress in the utilisation of metal for the construction of the machines. Below will be found some notes giving the general characteristics of the machines on view, and next week we purpose supplementing this with details of the methods of construction, etc.

Austin Motor Co., Ltd. (STAND 66)

Longbridge Works, Northfield, Birmingham
ONE type of machine, the "Whippet," is being shown—one complete machine, and one "dissected"—by the Austin Co. The "Whippet" is a single-seater tractor biplane for civil use, suitable for business, sport and pleasure. It is essentially a one-man plane, being designed specially for the "owner-pilot," maintenance and flying being brought to the greatest degree of ease and simplicity. This is achieved in the "Whippet" by constructing the fuselage entirely of



steel, and fitting streamlined steel struts in place of bracing wires, thus doing away with the necessity of constant re-rigging. It also has folding wings—which are very securely locked in position when flying—enabling the machine to be housed in a shed 18 ft. long, 9 ft. wide and 8 ft. high. It is an easy machine to fly—it can be flown with "hands off"—and the landing speed as low as 35 m.p.h. The steel construction is also advantageous in tropical climates, apart from the question of strength and ability to withstand rough usage.

The engine is a 45-50 h.p. 6-cyl. radial Anzani, with which a maximum speed, at ground level, of 95 m.p.h. is obtained. The speed at 10,000 ft. is 80 m.p.h., and the climb to 5,000 ft. and 10,000 ft. is 9 mins. and 22 mins., respectively. The wings, which have a high factor of safety, are of standard construction, whilst the tail plane can be adjusted to suit different weights of pilots. An orthodox V-type landing chassis is fitted, and the tail skid is steerable, consisting of a compression spring working inside telescopic tubes; in order to give a good wearing surface, a special shoe is fitted, consisting of vertical laminated plates.

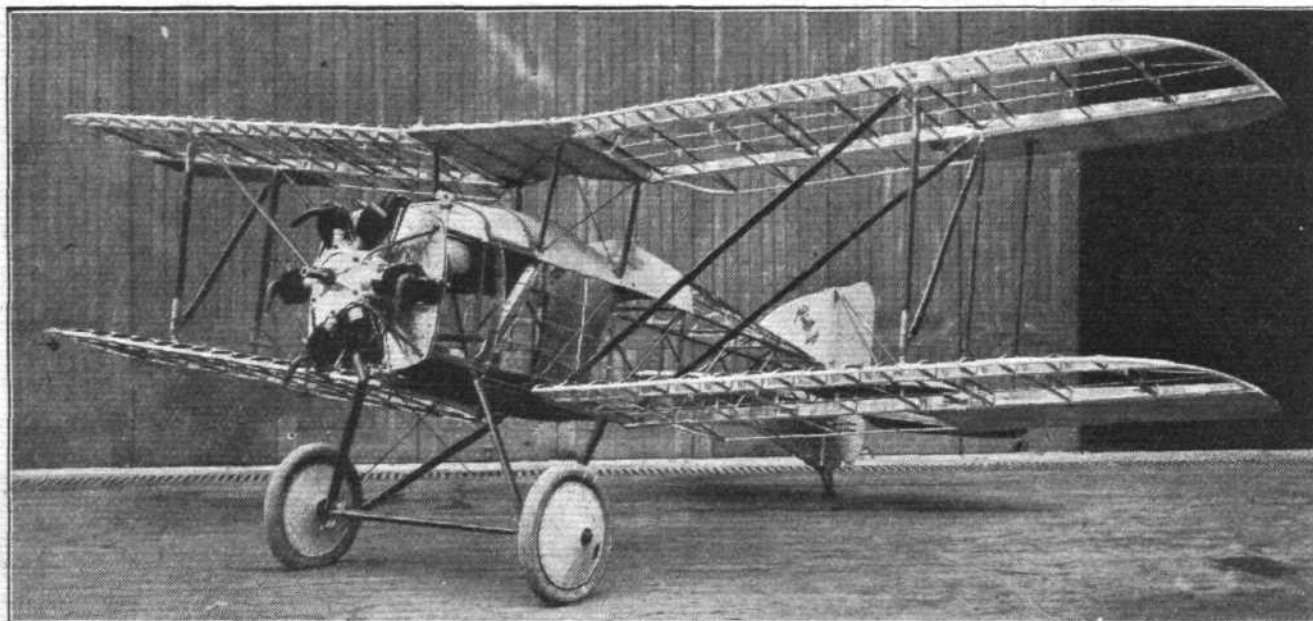
A comfortable seat is fitted, and the cowling and wind-screen are arranged so as to give complete protection to the pilot. A cupboard is provided under the seat for luggage and tools.

In addition to the foregoing, the Austin glandless petrol pump is also exhibited.

Wm. Beardmore and Co., Ltd. (STAND 65)

Parkhead, Glasgow

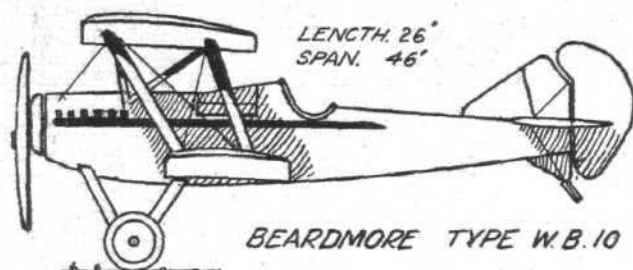
IN addition to a 6-cyl. 160 h.p. Beardmore aero engine, a section of a passenger car as used on R. 36 type rigid commercial airship, models of R. 34 rigid airship, H.M.S. "Argus"—the first "floating aerodrome"—the W.B. IX flying boat, parts of R. 34, bombs, and several interesting photographs, two complete post-War aeroplanes are being shown by the Beardmore Co. One of these machines, the W.B. II, is a two-seater tractor biplane, similar in general design to the W.B. II fighting, reconnaissance and long-distance patrol machine used in the R.A.F. The fuselage is of the braced girder type, having four ash longerons and struts of spruce, braced with swaged steel rods, and faired to a circular cross-section. Special attention is given to the comfort of the pilot and passenger who are seated in tandem,



Three-quarter front view of the Austin "Whippet" in skeleton form

behind the main planes, in roomy, well-finished cockpits. Ample provision is made for tools, luggage or mail.

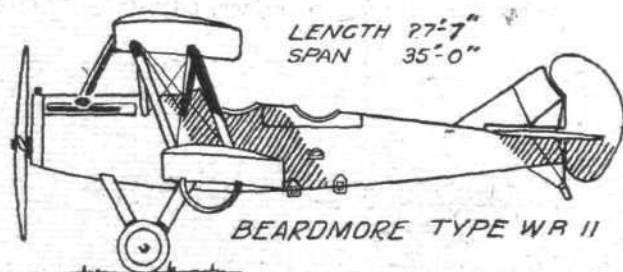
The main planes are of the usual braced type, having streamlined spruce struts, lightened where necessary, and all exposed bracing of streamlined wire. Provision is made for adjusting the angle of incidence of the tail plane during flight, from 0 degs. to + 5 degs. The rudder is balanced, and the vertical fin is adjustable laterally to counteract slip stream torque, and so taking any load off the rudder bar. The control is of the usual type, the rudder bar being adjustable to five positions for length of leg. The landing chassis is of the V type, exceptionally strong, with articulated



axle of special high-tensile steel tube in streamlined fairing. The tail skid is of ash with steel shoe and swivels for steering on the ground. Either a 160 h.p. or 200 h.p. Beardmore 6-cyl. engine is fitted. The engine is silenced, and a hand winding gear is provided in the pilot's cockpit for starting up.

The second machine exhibited is the W.B. X, which has been designed to meet the requirements of the forthcoming Air Ministry Competition, in which safety, economy, and comfort are the chief qualities desired. As shown, this machine is fitted with wooden wings, but all-metal ones will be fitted for the competition. It may be used for long-distance, touring or general flying. The wings can be folded, thus greatly reducing housing space. The pilot is situated in the rear cockpit, and the passenger in an enclosed cabin in front, access to which is by means of a folding ladder. The cabin is very comfortably fitted up, and is provided with a folding table. Triplex windows, in detachable frames, are fitted, and the top of the cockpit may be opened or closed as desired.

The fuselage is a circular section streamlined type braced structure of Duralumin, with longerons formed with airship type bracing. Struts and ties are of Duralumin, and tubular struts fitted with universal connections aid dismantling. Cowling round engine of Duralumin, but remainder of fuselage is covered with fabric supported by light Duralumin stringers. All Duralumin is treated and varnished to resist corrosion. The main planes are built up of spruce spars wound with glued tape and spruce ribs, steadied with stringers and diagonal tapes. Box and intermediate ribs are strengthened at the leading edge to resist torsion and down pressure; the trailing edge is of Duralumin tube.



Interplane struts are of steel tube faired to streamline sections and bracing of streamlined wire. The planes are covered with doped and varnished fabric, and inspection windows and doors are fitted where necessary. The tail plane can be adjusted (0 degs. to + 5 degs.) from the pilot's seat; it is built up like the main planes, and has swaged rod bracing. All control wires are inside the fuselage, and operate a shaft which in turn moves the elevator levers. The fin and rudder are built up on a steel framework with Duralumin ribs and stringers. The landing chassis and tail skid are similar to those described for the W.B. II, and the remarks on the power installation for the latter also apply to the W.B. X. The radiator, however, instead of being mounted in the nose, as with the W.B. II, is set in the top centre section. In

both cases air control shutters, operated from the pilot's seat, are fitted.

On both types the main petrol tank is in the fuselage with a small "service" tank concealed in the centre of the top plane. The fuel is raised by a wind-driven Austin glandless pump to the service tank, whence it flows by gravity to the carburettor, any surplus being returned by an overflow pipe to the main tank.

During the exhibition a W.B. II will give demonstration flights, under the charge of Capt. C. E. Ward, at Cricklewood Aerodrome.

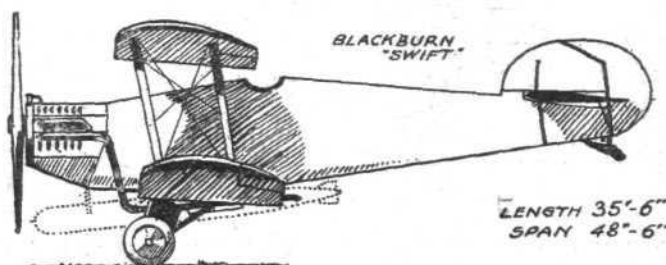
Blackburn Aeroplane and Motor Co., Ltd. (STAND 64)

Olympia, Leeds. The machine exhibited by this firm will be one of the latest torpedo-carrying ships' aeroplanes. Official permission to exhibit has been granted on condition that certain special equipment is not shown. As exhibited the machine will therefore be minus the torpedo and its gear, but the special arrangement of the undercarriage is evidence of the purpose for which the machine is ultimately intended.

The pilot's view, always an important consideration, is even more important in a machine intended for use from a ship where the space available is restricted. In the Blackburn "Swift" this feature has been especially studied, the high position, the lines of the fuselage, and the forward stagger of the wings all tending towards that object. Incidentally it may be mentioned that the problem of providing folding wings is complicated by a stagger, and the manner in which this difficulty has been overcome in the Blackburn "Swift" will no doubt attract a good deal of attention.

Concerning the detail design and construction of the "Swift" we hope to have more to say in next week's issue. Suffice it here to point out that the question of ease of upkeep has received attention, and that the whole of the central unit, comprising the engine mounting, the centre part of the fuselage, the undercarriage, and the centre section of the wings is a steel framework which, it is anticipated, will need practically no trueing up in actual use.

The question of fire on board is an ever-present danger which, in the "Swift," has been guarded against by separating



the entire engine installation from the rest of the machine by a fireproof bulkhead. The main petrol tank is of the self-sealing type, so that even in a crash there is little likelihood of the tank catching fire. The petrol is pumped positively from this main tank to a small gravity tank placed in the upper plane. The engine installation is arranged to give good accessibility for small engine adjustments, and also permits of easy removal of the engine unit for full overhaul.

As a ship's aeroplane the "Swift" is fitted with airbags for flotation in the case of a forced landing on the sea, and the wheels are automatically removable in the air to render safer the alighting on the sea. Needles to say, slings are provided for hoisting the machine on board ship.

It may be pointed out that the Blackburn Co. have had some three years' experience with machines for bomb-dropping, and that the "Swift" represents the practical results of this experience.

Bristol Aeroplane Co., Ltd. (STAND 59)

Filton House, Bristol. The Bristol exhibits consist of the four-engined Pullman triplane, and the three-seater Tourer coupé.

Most of our readers are already acquainted with the former machine, which has recently given some very satisfactory results during a number of trials carried out at Bristol. The ordinary uncorrected air speed readings show a maximum speed of some 134 m.p.h. With the engines at little more than half throttle the speed recorded was in excess of 100 m.p.h. No actual figures were taken at this time concerning the climb, but it was said that it climbed much more like a fighting machine than a passenger plane. Especially satisfactory was the fact that the machine on every occasion took off from the ground within, at the most, 180 yards after the engines had been let out, whilst a similar run after

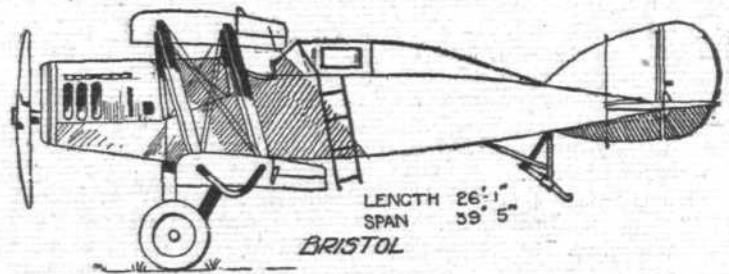
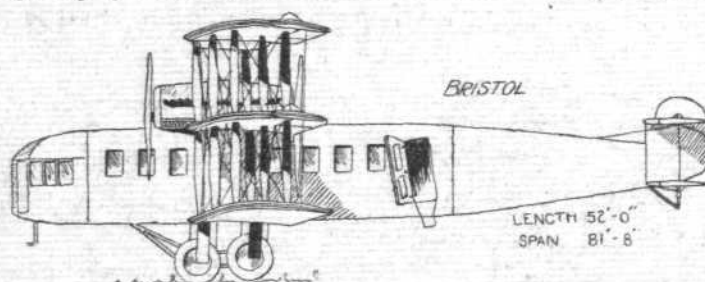


The Bristol "Puma" Three-seater Tourer : Shewing how the roof of the coupé cabin can be opened up

landing was experienced. The whole of the first half of the fuselage is formed into a commodious and luxurious cabin, providing accommodation for 14 passengers in addition to the pilot and engineer, the latter occupying the extreme fore part of the cabin. The cabin is 7 ft. in height, and a central gangway affords access to the comfortable fauteuils which, though removable, are normally placed on either side of the cabin. Large Triplex glass windows are provided for the convenience of each passenger, and an adequate system of heating and lighting by means of electricity is installed. The question of

dihedral angle, but are not staggered. Balanced ailerons are fitted to the top and middle wings. The tail is of the biplane type with three fins and rudders. The four engines, each of 410 h.p., are mounted two in tandem on each side of the fuselage on the middle plane, and each unit drives a tractor and pusher screw.

The Tourer coupé machine is intended as a high-speed cross-country tourer. With its high-powered engine, large tank capacity, sturdy construction, excellent stability and manoeuvrability, it provides a machine suitable for safe and

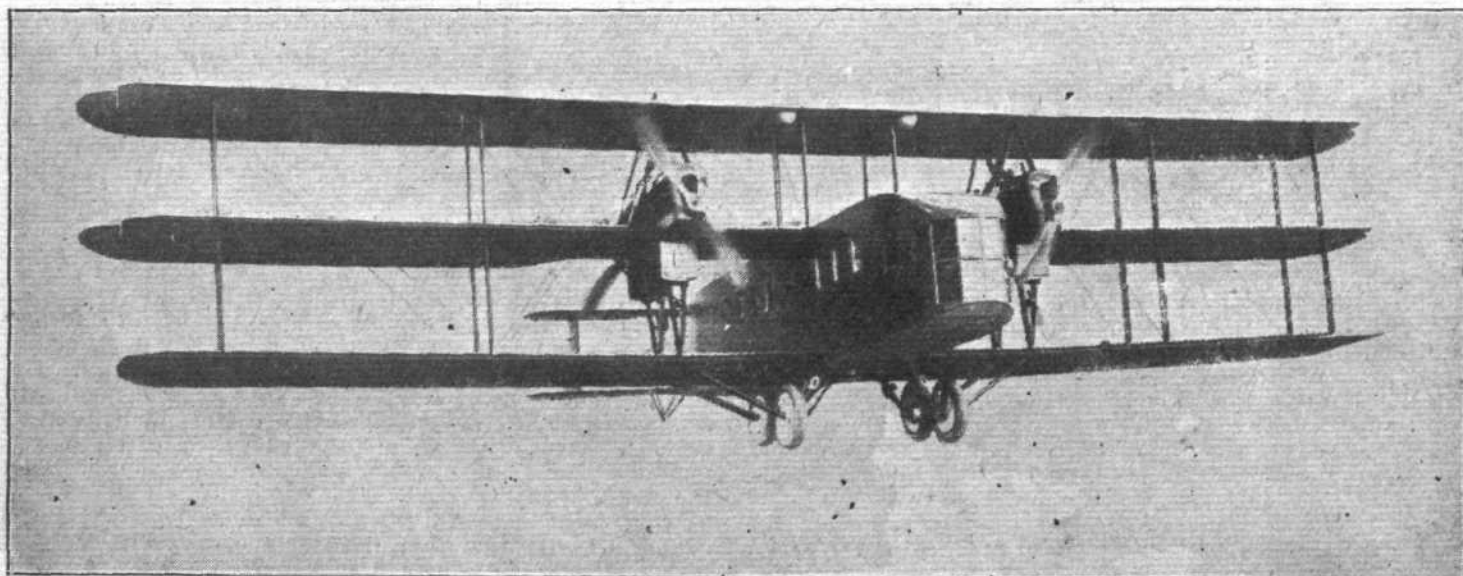


ventilation has also been carefully studied. Any or all of the seats may be removed for the conveyance of mails or cargo, and a total space of 570 cubic ft. can thus be made available. In addition to the two pilots the machine is capable of lifting a load of 2,700 lbs. with fuel for five hours' flight, or alternatively 4,000 lbs. with fuel for two and a half hours' flight. These figures are based on an economical speed of from 100 to 105 m.p.h., i.e., at three-quarter throttle giving a sufficient reserve of power to reach a maximum speed of 125 m.p.h. if necessary. All three planes are given a sweep back and a

comfortable flying in all weather conditions, and capable also of landing in, and arising from, very constricted areas.

A Siddeley Puma six-cylindrical vertical water-cooled engine is installed, developing 246 b.h.p. at its full normal revolutions of 1,400; it may safely be run, for short periods, up to 1,500 revs., at which the power developed is 255 b.h.p. Dual ignition, by two 6-cylinder magnetos, is fitted.

A nose radiator is fitted between the fore end of the engine and the air-screw, and Venetian blind type shutters are fitted to the front of the honeycomb surface, adjustable from the



The Bristol "Pullman" triplane in flight

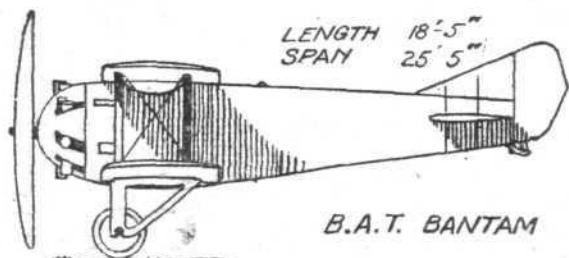


Side view of the B.A.T.
"Bantam"

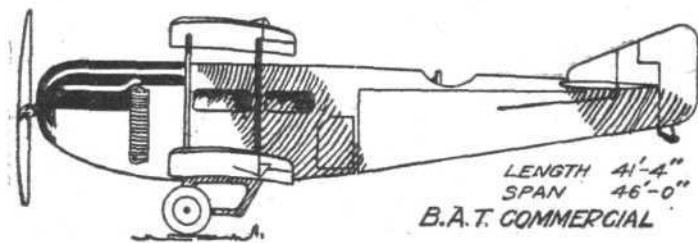
pilot's seat and capable of entirely covering the honeycomb area, a very desirable feature in long glides.

The pilot's seat is so placed in the fuselage that his eyes are about 6 ins. below and about 6 ins. behind the trailing edge of the top centre section; this position has been found to be the best for visibility. The passengers are seated side by side in a roomy and comfortable cabin immediately behind the pilot. This cabin top, which is provided with side and top windows, hinges back to afford access, a metal ladder extending from the top longeron to the ground further facilitates matters. As regards the rest of the machine,

purposes. It is a tractor biplane of the cabin-fuselage type fitted with a 350 h.p. Rolls-Royce Eagle VIII engine. In actual performance it is capable of taking a useful and remunerative load of 1,000 lbs., with sufficient fuel on board to give her an effective range of 660 miles at an economical cruising speed of 110 m.p.h. Constructionally, the machine is clean, simple and straightforward throughout, which makes for ease and economy in effecting running repairs. The cabin—8 ft. long by 6 ft. high by 3 ft. 3 in. wide—has no internal cross-bracings or obstruction to obstruct the freedom of movement and comfort of the passengers



B.A.T. BANTAM



B.A.T. COMMERCIAL

this follows more or less the already familiar Bristol "Fighter" lines. The setting of the "fixed" tail plane is adjustable by a hand lever on the R.H. side of the pilot's cockpit; by its use the machine may be trimmed so as to fly level "hands off" at any desired speed, and also with varying weights.

British Aerial Transport Co., Ltd. (STAND 46)

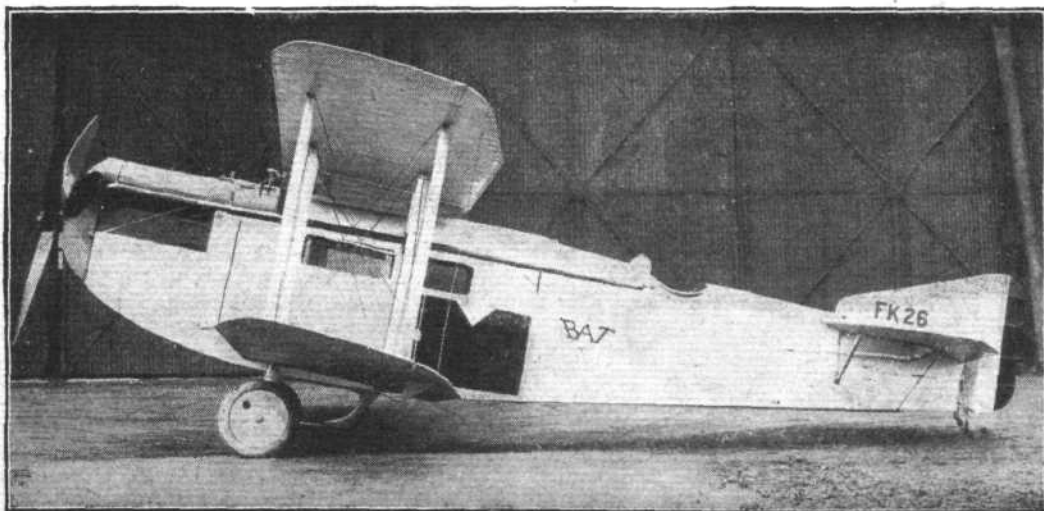
38, Conduit Street, London, W. 1.
Two B.A.T. machines are exhibited by this firm: the "Commercial Mark I" and the "Bantam A.B.C. Wasp II." The former, which was fully described in *FLIGHT* for April 17, 1919, is noteworthy in bearing the distinction of being the first post-war aeroplane constructed solely for commercial

carried. That such a large cabin could be introduced into a machine of such relatively small over-all dimensions (the fuselage measures only 35 ft. and the span 46 ft.) is exceptional, especially as it has been attained without sacrificing any strength at the cabinpart of the fuselage.

A strong and sturdy landing chassis, a combination of elastic and Oleo shock absorbers, is fitted, which, together with the machine's low landing speed (45 m.p.h.), allows safe landings being made under most trying circumstances.

The aim behind the design of the Bantam was to provide a single-seater fighter which would not only have a good performance but which would stand up to rough usage

Side view of the B.A.T.
"Commercial"

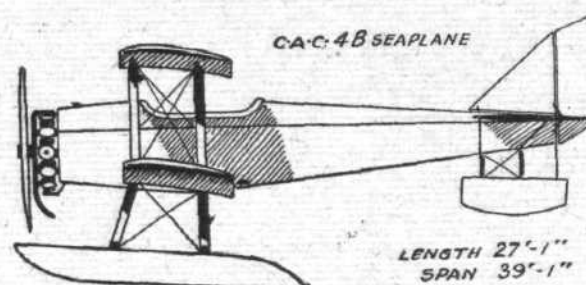


under the very worst operating conditions, which would be inexpensive in first cost and maintenance, and capable of being produced in large quantities. In May of this year it was submitted to the authorities, fitted with an A.B.C. Motor of Wasp Mark II type developing 200 h.p. Tests were carried out at Martlesham Heath, and extraordinary results were obtained. Full details cannot be quoted yet, but an idea can be gained of its performance when it is stated that the speed at 10,000 ft. was 146 miles per hour and the climb to 17,000 ft. effected in 16 minutes 18 seconds—both tests with full military load.

One of the main unique features of this machine is the design and construction of the *fuselage*. The structure consists entirely of large sheets of three-ply birch fixed on oval section formers which are supported on four ash longitudinals. This system enables it to withstand practically unlimited damage from enemy fire, without collapsing, and, in addition, it is extremely easy to repair. The necessity for continual "trueing up" is also entirely dispensed with.

Although the machine is a diminutive biplane, with an overall span of only 25 ft. its wing bracing on either side of the body is of the "two-bay" type, providing a very stiff and strong structure and enabling the rubber-sprung landing chassis to be fitted under the wings at the inner struts. This gives a track of no less than 7 ft., making it practically impossible to damage wing-tips, etc., in the event of a bad landing. The planes are all attached directly

risky performance of swinging the prop whilst standing on the floats. In the design and construction of this machine, the outstanding characteristics are strength and simplicity, and from past experience of Mr. Fletcher's, the designer, work we feel confident that the new "Centaur" possesses these



qualities in the most efficient form. The performance of this machine, both on the water and in the air, is, we understand, remarkable for a machine of its size. Its speed range is 40-75 m.p.h. with pilot and two passengers, and its climb, similarly loaded, to 1,000 ft. is but 2 mins. 40 secs. It can be looped and rolled with absolute safety—the factor of safety being nowhere less than eight. The initial price of the "Centaur 4B" is moderate, whilst it is also cheap to run and



The C.A.C. Centaur Seaplane

to the *fuselage*, the absence of the usual centre plane struts and bracing adding considerably to the cleanness of the design.

Throughout the machine every part is of the simplest possible design. There are no forgings, and cast and machined parts are practically absent. As a fighter the machine possesses unique qualities. The pilot is so placed that by raising his head slightly through a hole in the top plane he has a clear view round in all directions, while the sides of the *fuselage* under the top wing are so cut away as to provide a perfect view downwards both in front and behind the bottom plane. The armament consists of two Vickers' guns firing through the propeller by means of the C.C. gear, and 1,000 rounds of ammunition; the guns being placed inside the *fuselage* on either side of the pilot, they are very accessible and easily attended to in the air.

Central Aircraft Co. (STAND 67)

Palmerston Works, Kilburn, and Northolt.

THE "C.A.C." exhibit consists of the "Centaur 4B" 100 h.p. three-seater seaplane. This machine, like the "Centaur 4A" land 'bus, is a modification of the "Centaur 4," being an improved and slightly enlarged edition of this machine. It is a small tractor seaplane of the twin-float type, fitted with a 100 h.p. Anzani engine. The floats have been the subject of considerable thought and experiment. Their co-ordination with the lifting power of the wings is excellent—they do not start to hydroplane before the latter are capable of supporting the weight of the machine, neither do they refuse to come "unstuck" when the right moment of taking off comes. Steering when on the surface of the water is effected by means of a small water rudder attached to the stem of the tail float. A C.A.C. patent self-starting device for the engine, operated from the pilot's cockpit, is installed—an important feature in connection with seaplanes, obviating as it does the

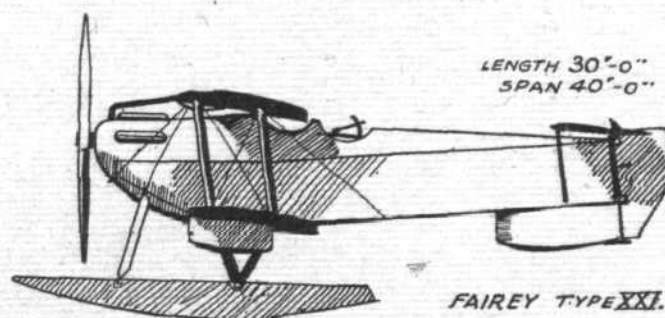
maintain—the fuel consumption being in the neighbourhood of 7 gals. of petrol, and one gal. of oil per hour.

Fairey Aviation Co., Ltd. (STAND 47)

Hayes, Middlesex.

As the machine exhibited by this firm has been designed and built to the order of the Air Ministry, we are not at liberty to publish any particulars of this machine other than the following brief notes.

The machine is a twin float two-seater tractor seaplane of



40 feet span and 30 feet overall length, adapted to be folded on the water. The engine is a Napier "Lion," 450 h.p., with electric self-starting gear operated from the seat. It is equipped with the Fairey patent Variable Camber Wings which enables the use of loadings of from 11.5 to 12 lbs. to the square foot. This machine has a further new feature whereby the tail operating gear is interconnected with the camber operating gear so as to give automatic self-adjustment for the shift of the centre of pressure when operating the camber flaps. A further feature of the machine is the

system of construction. Instead of the engine, tanks, pilots, passengers, etc., being accommodated in a central fuselage as in the usual type, the machine is built on a vertical steel centre frame or cellule. This is of entirely steel construction. To it are attached the fore part of the fuselage carrying the engine, with radiator, water tanks, piping, etc., complete. The whole of this unit, including the cowling, dismantles by the removal of eight bolts. The same applies to the after half. Chassis, wings, etc., are also rapidly detachable and the machine can be taken down for packing and transport in very small portions. The machine is equipped with the usual Fairey floating system of the two-step type with extended buoyancy chambers aft. It rides tail up on the main floats alone, the tail float being fitted only for purposes of folding the machine on the water. In order to give clear fire aft of the rearward gun no top fin is fitted on the tail, the required fin surface being given by the tail float, rudder and the enlarged size of the fuselage. The machine is slightly staggered in order that in folding the wing tips shall rise clear of the water.

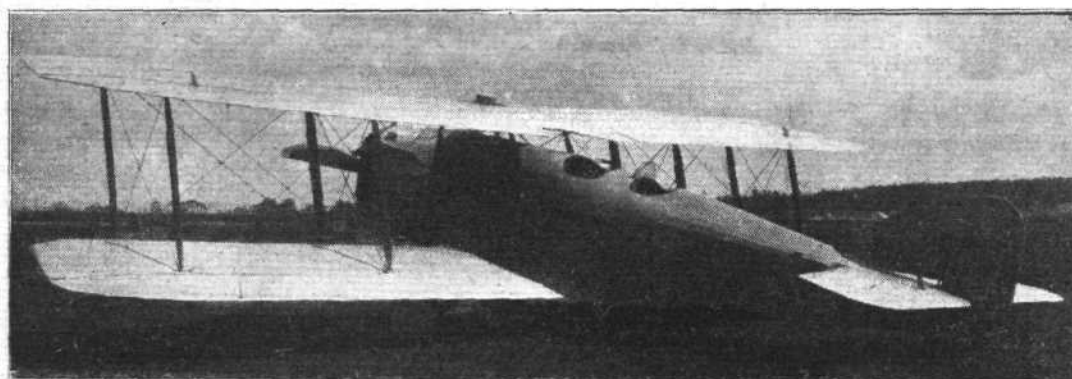
Martinsyde, Ltd. (STAND 43)
Maybury Hill, Woking.

THREE types of Martinsyde aeroplanes are shown on this

under which the machine will be used. The pilot is located immediately behind the cabin, some distance aft.

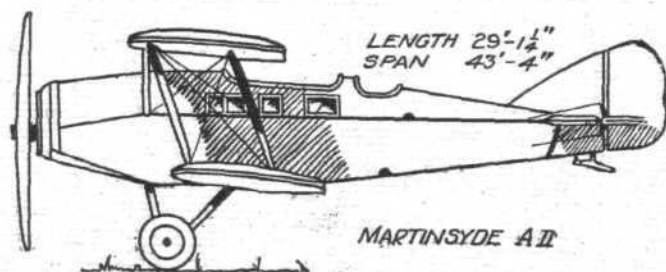
The machine is fitted with a 300 h.p. Hispano-Suiza engine and has a cruising speed of 100 m.p.h. The radiator is mounted in the nose of the fuselage. A compressed air starter operated from the pilot's seat is fitted, and duplicate instruments are provided for the passengers. Floats and float undercarriage are also shown in connection with the A Type machine, and can be readily substituted for the land undercarriage, converting the machine into a remarkably serviceable and efficient seaplane. The floats are constructed of consuta wood, and are fitted with two steps built on to the main structure. They are divided into four watertight compartments, and provision is made for the wheels to be fitted to an axle passing through the floats for beaching and launching purposes. The undercarriage itself consists of four spruce struts with metal shoes transmitting the weight from the fuselage to the two axles, which in turn distribute it over the floats. The whole structure is braced with heavy gauge streamlined wires, and forms a unit of unusual strength and low head resistance.

In other respects this machine is of typical Martinsyde construction and design. The main planes are of equal span



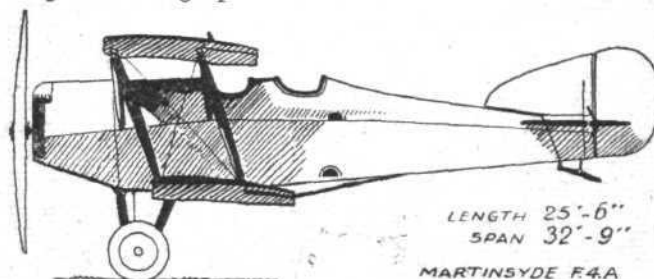
The "Martinsyde
"A2" built to
carry pilot and
four passengers.
This view shows
the "open cabin"
type

stand, as follows: The "A" type Mark II, the F.4.A two-seater, and the "Semi-quaver." The former machine has been designed to fill the demand for a commercial aeroplane of low capital cost and maintenance. The example shown is arranged to seat four passengers and the pilot, while provision is made for a small amount of hand luggage. The



and chord, with the top plane staggered forward, and two pairs of interplane struts each side. Ailerons on both upper and lower planes.

The F.4.A Two-seater is an adaptation of the famous Martinsyde "Buzzard," and combines the qualities of great strength and high performance which made that machine



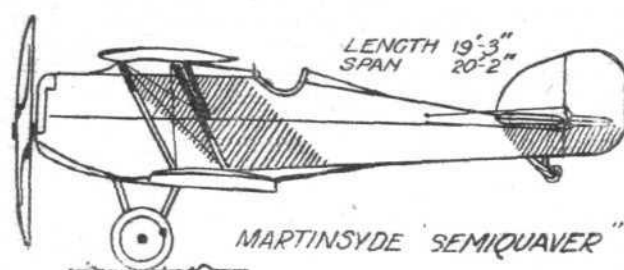
the most efficient fighting scout in 1918. The example shown is fitted as a two-seater with dual controls. It is an excellent school machine where it is necessary for pupils to become accustomed to handling fast aeroplanes. It is ideal for sporting and touring purposes, or for postal and commercial services where high speed is essential.

passengers are comfortably seated facing forward, and are in an excellent position for obtaining a view of the country over which they are passing. The passengers' cabin is so arranged that it can be either closed or open to suit the requirements of the individual buyer or the climatic conditions

Three-quarter
rear view of the
Martinsyde F4 a,
two-seater



The Martinsyde "Semi-Quaver" is a small single-seater racing aeroplane designed to compete in the sporting events



In addition to the foregoing, five examples of Martinsyde propellers are exhibited. Four of these are designed along

The planes follow the same general arrangement as previously employed on the large four-engine machines. The spans of the top and bottom planes are equal and a dihedral angle is given to the bottom plane only. The *ailerons* are constructed on the firm's patented system of balance which was first fitted to the large four-engine machine, with the result that this large machine can easily be controlled by one pilot without the use of servo motors or other contrivance. The



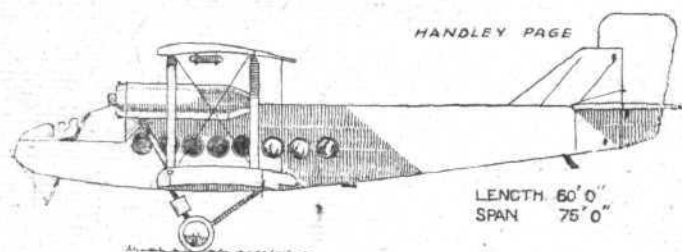
**The Martinsyde
"Semi-Quaver"
high-speed
single-seater
scout**

The *fuselage* is devoted entirely to carrying the crew, passengers and/or cargo. The pilot and engineer are seated on the extreme nose of the machine in a comfortable cock-pit, in which all engine controls, instruments and other apparatus necessary for the working of the machine are arranged within easy reach of the pilot or engineer, as required. The dashboard carries a full set of instruments, and provision is made for Marconi wireless gear to be fitted if required. Both pilot's and engineer's seats are comfortably upholstered, and the rudder bar is adjustable both as to height and distance from the pilot. A partition immediately to the rear of the pilot divides the forward cock-pit from the main *fuselage* saloon or cargo space. This saloon occupies three complete bays of the *fuselage* and measures 4 ft. 6 ins. wide by 6 ft. high by



Three-quarter front view of the twin-engine Handley-Page "W 8"

22 ft. long. The whole of this space is provided with flooring which is of a new type, considerably lighter and stronger than previously used. Adjustable Triplex Safety Glass windows are fitted in the sides of the fuselage, and seating accommodation



provided for 15 passengers, each of the passengers having a window immediately next to him. As previously mentioned, no struts or internal structure of any description occur throughout this saloon. A large side door is provided for access to the saloon, and steps are provided which can be adjusted to position from inside the saloon if necessary. For cargo purposes, trap doors can be arranged in the cargo space, as required. The fuselage is constructed in three sections. The front section comprises the pilot's cockpit, with all the instruments and controls. The second section contains the passenger saloon or cargo space, and the third and last section extends from the rear end of the saloon to the rudder post, either of these sections being easily changeable.

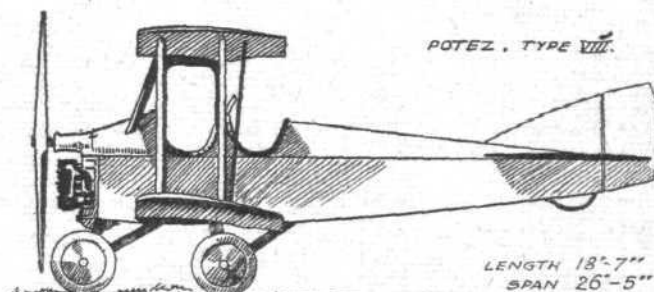
The engine nacelle framework is of steel tube, and is so arranged that the engine stands outside the wing hinges. The petrol tanks are carried on the same framework but behind the engines, and a fireproof partition is arranged between the tank and the engine. No bracing wires or struts pass through the petrol tank, and both the engine and tank are very readily removable when required. The oil tank is immediately behind the engine, and the radiator is of the nose type carried in front of the engine. The whole of the engine unit, tanks, etc., are covered with a stream-line aluminium cowl circular in cross section.

The undercarriage is similar in design to that used so successfully on the large four-engine Handley Page machines, and consists of two entirely separate units, each unit having two wheels, one below the engine and the other near the fuselage, and all members are universally jointed so as to allow for any movement of either shock absorber. No portion of the undercarriage projects below the fuselage, and thus any arrangement for dropping mails, etc., from the fuselage will not be interfered with. The tail skid is of the usual type, with the exception that it is kept almost entirely within the fuselage, thus considerably reducing head resistance. A monoplane tail is fitted of ample size, and carries the usual elevators. The vertical surfaces consist of a monoplane fin and balance rudder arranged on the centre line of the fuselage. The elevators are unbalanced, but are carefully proportioned so as to reduce the load on the pilot's hand, and, in addition, hand-adjusting gear is provided for the tail plane itself, whereby the pilot can alter the trim of the machine at any time during the flight.

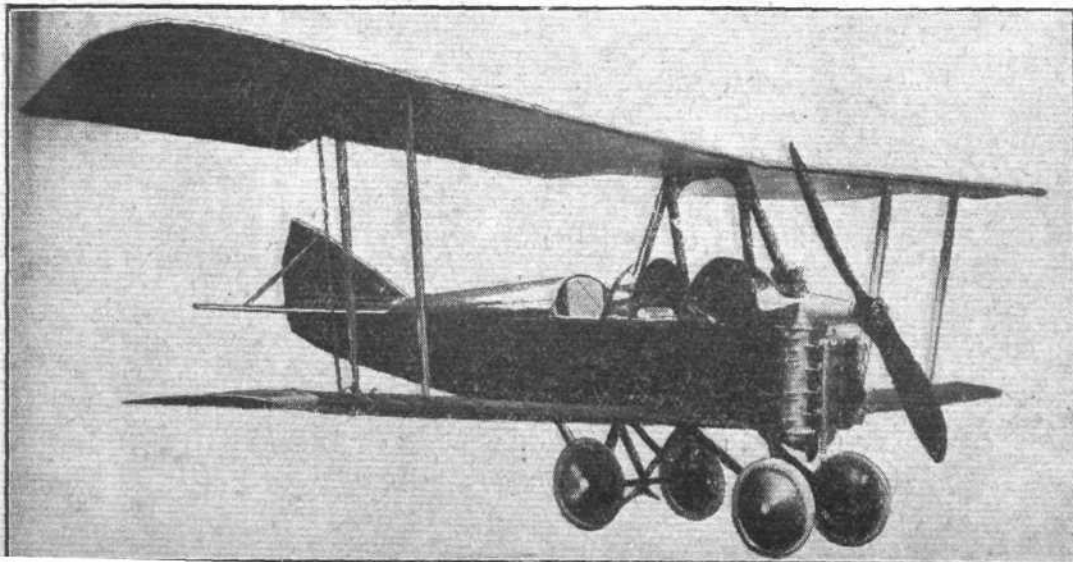
Henry Potez. (STAND 62)

Aubervilliers (Seine), France.

M. HENRY POTEZ—who is, it appears, the only foreign exhibitor in the full-sized aeroplane section—is showing the



small, and interesting, 50 h.p. Sporting biplane, which attracted no small amount of attention at the Paris Salon last year. Inasmuch as we fully described this machine,



The 50 h.p. N. Potez, type VII, Sporting biplane. Note the unusual arrangement of the engine

in connection with the Paris Show, in *FLIGHT* for Jan. 15 last, it is only necessary at the moment to but briefly outline the general characteristics. It is a *fuselage* tractor biplane in the construction of which duralumin plays an important part. Its most prominent feature consists of the arrangement of the engine, a 50 h.p. 4-cyl. air-cooled Potez. This is mounted in the nose of the *fuselage* with the crankshaft in a vertical position and with the cylinder heads foremost. This allows the *fuselage* to be placed as low as possible whilst the airscrew, which is driven through bevel reduction gear, is located with its line of thrust normal. Another advantage in this arrangement consists of the exceptional accessibility of the power plant. The *fuselage* is built up of wooden *longerons* and struts, covered with three-ply, and is carried on a sturdy four-wheeled landing chassis. The main planes are built entirely of duralumin, the spars being of channel section. *Ailerons* are fitted to the top plane only, and are positively operated through horizontal tubes passing through the lower plane, and vertical connecting struts and L-cranks. The inter-plane struts, of which there are two each side, in addition to the inverted V-type central cabane, are of streamlined duralumin tubes. Both planes are set at a dihedral angle and are without stagger or sweepback, but have a rather large gap.

The pilot and passenger are seated in tandem, in separate cockpits, the passenger occupying the front one, over the centre of gravity of machine. Both pilot and passenger have a very good range of vision.

A. V. Roe and Co., Ltd. (STAND 63)

Newton Heath, Manchester, and Hamble, Southampton. THREE commercial type Avros are being exhibited by this pioneer firm, as follows: Type 534 "Baby" Sporting single-seater, Type 547 A Commercial Triplane, and Type 548 "Tourist" three-seater.

The Avro "Baby," fitted with a 35 h.p. Green engine, will probably draw the most attention, particularly as it is the machine on which Mr. Bert Hinkler recently made his

many cross-country flights. It also won the efficiency prize in the Aerial Derby last year.

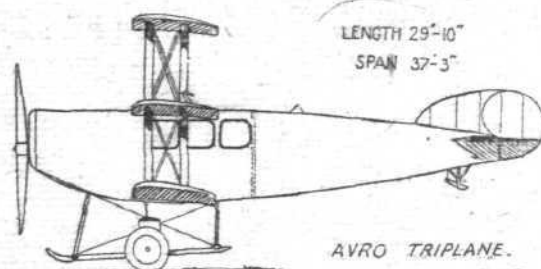
The "Baby" can be spun, looped, rolled, etc., to suit the most exacting "stunt" pilot's requirements, although at the same time, it is an exceedingly stable and safe machine to fly, and has a very low landing speed. The cockpit is roomy and comfortable and the pilot has an excellent view.



An Avro baby. Type 534, with 35 h.p. Green engine—the actual machine which Mr. Bert Hinkler flew to Turin and back recently

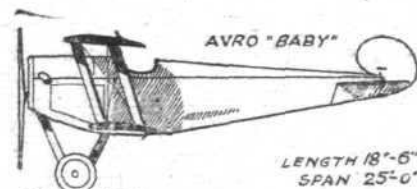
The machine can be fitted with floats to make a sporting seaplane, and also can be supplied with a modified *fuselage* with seating accommodation for two. A full description of this machine appeared in *FLIGHT* for June 26, 1919.

The "Avro Commercial" Type 547 triplane, with 240 h.p. Siddeley "Puma" engine, designed purely as a commercial machine, is built on distinctive Avro lines, and many of the parts are interchangeable with those on the standard training



AVRO TRIPLANE.

marvellous non-stop flight from London to Turin. It is claimed that the Avro "Baby," which has been specially designed for the private owner who wishes to fly and attend to his machine, is less costly, more economical to run, and requires less attention than a motor-car, and Mr. Hinkler's performance goes far to justify the claim. The first machine of this type flew for over twenty hours without any adjustment, although it had been raced and "stunted," and made



machine. This permits of very low production costs and facilitates the maintenance of the machine as all parts subject to wear or damage can be replaced from stock. The pilot is seated well back where he has a clear view for landing or taking off. Between the two lower planes a roomy cabin is situated and fitted exactly like a railway compartment, to seat four passengers—two facing forward and two backward. A large side door gives easy access and triplex glass windows allow a clear view of the country below.

The seats may be instantly detached, and stowed away in

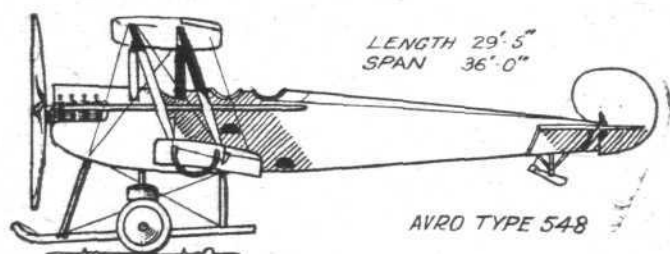


The Avro Commercial triplane, type 547 A, for four passengers



Avro, type 548, three-seater Tourist biplane. A modification of the standard 504 K, with 80 h.p. Renault engine a combination which has several points to commend it from an aerial touring point of view

a locker, leaving a clear space of 113 cubic feet for cargo. Special attention has been paid to heating, lighting and ventilation, thus making the machine ideal for long passenger flights.



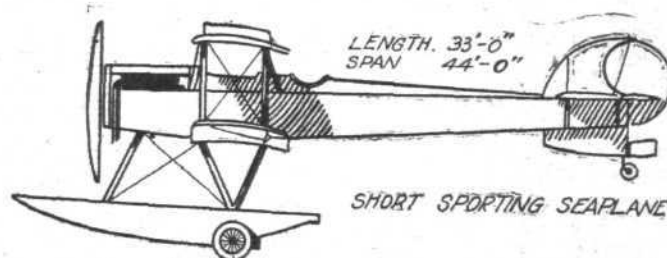
The Avro "Tourist" three-seater, Type 548, is a development of the Standard Training Biplane, Type 504K, and retains the excellent aerodynamic qualities of that well-known machine. The modifications consist of eliminating the dual control and providing accommodation for seating two passengers in tandem behind the pilot who controls the machine from the original front cockpit. The nose of the fuselage is modified to provide a suitable mounting for the 80 h.p. air-cooled Renault, an engine well-known for its reliability and economy in fuel consumption. The petrol tank is fitted in the centre section, giving a gravity feed to the carburettor, thereby eliminating the usual complication of a "pressure feed" system. The machine is admirably adapted for economical touring, having a range of 200 miles, whilst for joy-riding, it possesses the same qualities of low landing speed and controllability which are the distinguishing features of the Standard Training Machine. Furthermore, the fact that standard motor-car petrol and lubricating oil can be used, precludes any possibility of delay due to lack of special fuels and oils.

Short Brothers. (STAND 44)

Whitehall House, 29-30, Charing Cross, London, S.W.1. A SPORTING type seaplane, and a new "Swallow" all-metal biplane are exhibited by this firm.

The Sporting type seaplane is designed as a general utility machine. The functions it will fill are numerous, and for convenience can be described under two headings:—Military and Commercial.

In the former case, accommodation is provided for pilot and three passengers. The seating arrangements are: the two front seats tandem fashion and provided with dual control, the rear seats side-by-side. Thus it will be possible to carry out tuition work not only in flying, but in gunnery, wireless, photography and bombing. For these latter, pilot instructor and pupil can be accommodated, plenty of room being provided in the rear seats for wireless, guns or cameras. The view from the rear seat is excellent, and good arcs of fire are obtained. For the above work the machine



is fitted with a 160 h.p. Beardmore engine, as a high performance is not required and economy in fuel is very necessary.

For War work, or where a higher performance is desired than that normally attained with the Beardmore engine, the "Siddeley Puma" engine of 240 h.p. is



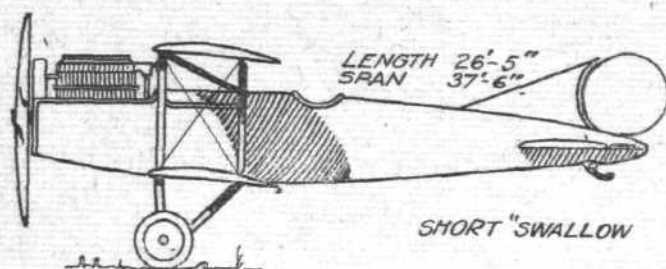
The Short Sporting type seaplane, with 160 h.p. Beardmore, which has folding wings

installed. This engine fits the machine without any alteration, this being one of the features of the design.

In designing the Short Sporting type, great attention has been paid to the commercial side as distinct from the Military point of view.

For tuition, passenger work or the transport of small quantities of freight the machine is most suitable, and will fill the requirements of:—

- (1) The sporting man who wishes to purchase a machine in which he can learn to fly and take his friends for flights.
- (2) The experienced pilot who is desirous of running a passenger-



carrying and tuition machine at a seaside resort as a commercial undertaking. (3) Companies owning factories, i.e. holdings on rivers and lakes who require a quick method of transport for their officials, and for light parcels and mails.

The machine is designed on the standard lines of the Short seaplanes, and embodies all important details of construction which have been evolved during seven years of hard experience.

Particular attention has been paid to making the machine safe in landing and getting off the water, and to achieve this object some reduction in the possible speed attained of a machine of this size and power has been made.

A valuable feature in the design is that the machine is made to fold into small compass by means of the Short patent folding wing system which permits it being housed in a shed of very small dimensions. The actual size of the machine folded is 15 ft. wide by 33 ft. long by 12 ft. high.

To beach the machine an axle is passed through prepared holes in the floats, wheels are attached each end, and the machine can then be handled by two or three men with great ease. To assist handling on the ground a detachable wheel is fixed to the tail post, thus allowing the machine to be swung round or manoeuvred in its shed with the greatest facility. The floats of the machine are built on the well-known Short principle combining great strength and rigidity with lightness. A feature of the design is the curved bottom of the floats. This ensures quick get-away, and minimises the shock of landing, but is of particular importance when beaching the machine. Owing to the curvature, the bottom of the float does not touch the ground, all the wear and tear being taken by runners which are attached to the sides of the floats. These act like skids and are shod with metal to give greater durability.

The engine fitted for commercial work is the 160 h.p. six-cylinder Beardmore, it having been decided, after careful consideration, to fit an engine of known reliability and performance rather than install any of the newer, and as yet untried, engines of post-War design.

The Short "Swallow" all-metal biplane, is the outcome of this firm's wide experience in the construction of rigid airships, which has convinced them that this form of construction—employing light aluminium alloys—presents great

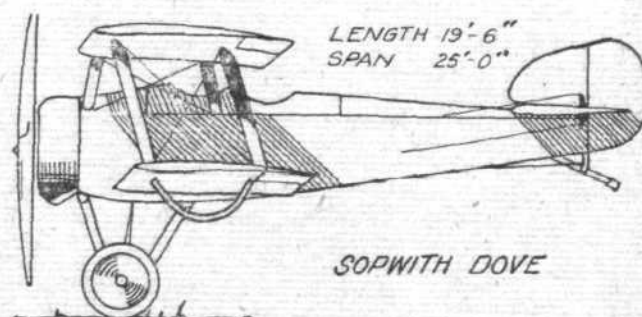
possibilities in the design and construction of heavier than air craft.

The construction generally lends itself to rapid production. Practically speaking, all the parts which comprise the making of a complete machine can be stamped out of sheet material. The machine shown is completely built with duralumin, with the exception of the wing spars, which are of steel tubing, and a few other minor parts in which it is found that steel is a more suitable material. The fuselage is a metal shell, similar in construction to the wooden monocoque type, and is virtually a streamline duralumin tube suitably stiffened with bulkheads, rings and longitudinals. Where holes are cut in this shell the edge is suitably stiffened by a roll of sheet duralumin. This structure has been thoroughly tested, and has proved of sufficient strength to withstand the necessary tail loads. The planes are built up with steel tubes for spars with lightened sheet duralumin ribs, the covering being sheet aluminum stiffened by small fluting at certain intervals. Ordinary cable wing bracing is used in conjunction with streamline steel struts. The lower section spars pass through bulkheads in the fuselage, which spread the load evenly over the fuselage shell. The undercarriage is of the ordinary vee type, sprung with elastic, and fitted with "Oleo" shock absorbers. The struts are streamline steel tube. The construction of the propeller is entirely novel, the body being an aluminium casting faced with duralumin. The engine, a 260 h.p. Siddeley Puma, is mounted on steel tubes held in position by built up duralumin bearers. No wood or fabric has been used, and great care has been taken to avoid all possible risk of fire, a fireproof bulkhead being fitted aft the engine. The machine is a single-seater single-engined tractor biplane, with "two-bay" wings, having been designed to carry mails or light freight to the amount of 400 lbs. If desired, this space could be designed to take two passengers in place of mails.

Sopwith Aviation and Engineering Co., Ltd. (STAND 42)

65, South Molton Street, London, W. 1, and Kingston. THREE Sopwith machines are shown, the "Dove," the "Gnu," and the "Antelope."

The "Dove" is primarily intended as a sporting two-seater tractor biplane, based on the famous Sopwith "Pup," whilst, if fitted with dual control, it is also particularly suitable



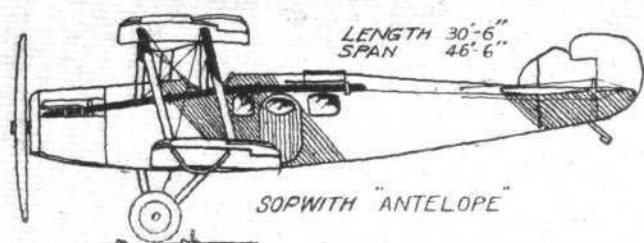
for instructing pilots, who have passed their preliminary tests, before placing them on high-powered single-seaters. The engine is an 80 h.p. Le Rhone, and petrol is fed by gravity, thus eliminating all pressure "troubles." Both pilot and passenger are comfortably situated, possessing very good visibility. It has an excellent speed range, 35 to 100 m.p.h.,



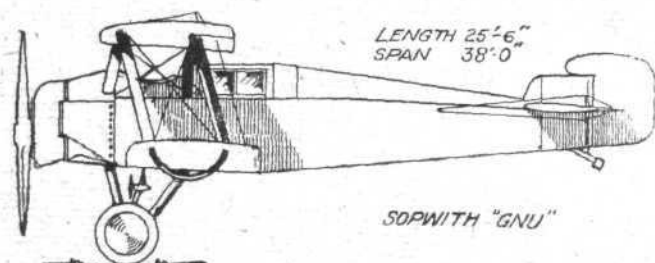
The Sopwith
"Dove" sporting
two-seater

and the low landing speed, together with the extra strong landing chassis, enables it to alight or get away from very small fields, etc. Except that the main planes are given a slight sweepback, the construction follows usual Sopwith practice, so that further description here is unnecessary. Fuel is carried for a period of 2½ hours at a cruising speed of 85 m.p.h., and an adjustable tail plane allows of the machine being flown with the maximum comfort.

The "Gnu" has been designed to meet the requirements of a light, high-speed machine for passengers or cargo. It



can be equipped either with the 200 Bentley rotary or with the 110 h.p. Le Rhone—both engines having proved extremely reliable upon active service. It is a tractor biplane, following along orthodox practice. Accommodation is provided for two passengers, or the equivalent in cargo, who are totally enclosed in a roofed and windowed cabin. The pilot is placed well forward in front of the cabin, and has very good visibility, being well protected from the "slip stream," enabling him to fly long distances without suffering discomfort. The "Gnu" possesses a speed variation of 100 per cent., pulling up when landing and taking off—owing to its light weight—very quickly. With the 200 h.p. Bentley



rotary, fuel is provided for a range of 250 miles, whilst in the case of the Le Rhone engined machine, this distance becomes 300 miles. The engine unit is extremely accessible, and in the event of necessity can be changed by two mechanics in five hours. An adjustable tail plane is fitted, enabling the pilot to trim the machine to suit the particular load that is being carried at the moment. The construction of the fuselage is on perfectly normal lines, and, if necessary, replacements or inspection can easily be carried out.

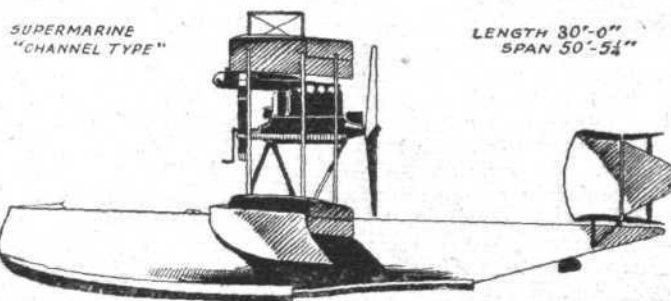
The "Antelope" is also a tractor biplane, on more or less normal lines, and is intended to serve the purpose of a utility machine, characterised by the highest possible performance compatible with great structural strength and having a wide speed range—38 to 100 m.p.h. Accommodation is provided for pilot and two passengers, the former being located high up between the main planes, whilst the latter are enclosed in a comfortable cabin of 50 cubic ft. capacity, aft of the planes. A door in the side of the cabin enables the passengers to enter straight from the ground. Triplex windows in the cabin provide a good field of view, whilst one of the passenger's seats is adjustable so that, on sliding open a door in the roof,

the passenger may sit in the open if desired. The engine, a 180 h.p. Hispano-Suiza "Viper," is enclosed by a quick detachable cowling, giving extreme accessibility, and is fitted with a Back and Manson self-starter, operated from the pilot's cockpit. A fire-proof bulkhead is interposed between the fuel tanks and engine. There are no welded joints in the machine.

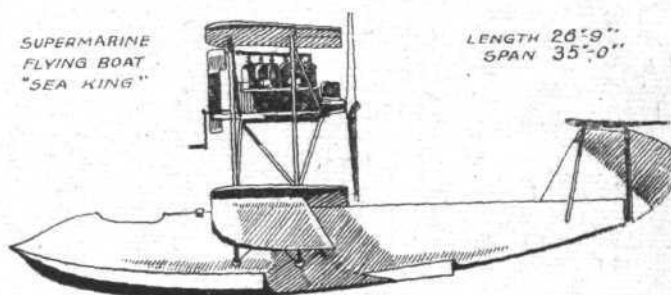
Supermarine Aviation Works, Ltd. (STAND 45)

Southampton.

THE Supermarine Co. are showing two complete machines, the "Sea-King," and the "Channel," both flying boats, and an extra control unit for converting the standard 4-seater machine into a school type.



The "Sea-King" is a small single-seater fighting scout, fitted with a 160 h.p. Beardmore engine. In general design this machine is similar to the "Baby," and the Schneider Cup models of last year. The hull is practically of circular cross-section, with a V-bottom from stem to step, which is situated under the main planes. Between the first step and the stern a second step "grows" out of the hull. The pilot is seated well forward. Upper and lower planes are each in three sections, and the interplane struts, of which there are four pairs, slope outwards. The two innermost pairs are located at the centre sections, the lower one of which is of considerably smaller span than the upper; this lower section is supported on the hull by two pairs of struts, forming continuations of the centre-section interplane struts. The



engine is mounted, in a streamline housing, midway between the planes on the lower centre section by six struts. The tail plane is of the monoplane inverted camber type, mounted on the top of a vertical fin above the stern of the hull. Wing-tip floats are mounted below the outer interplane struts. The speed range of the "Sea-King" is 51 to 96 knots (58.7 to 110.5 m.p.h.).

The "Channel Type" flying boat is a commercial machine providing accommodation for pilot and three passengers. It can, however, also be converted into a reconnaissance machine for war work in the following ways:—(a) With pilot and gunner, machine gun, W.T., and two 50 lb. bombs. Range, 350 miles. (b) With pilot and observer, machine gun and two 100 lb. bombs. Range, 350 miles. (c) With

The Sopwith
"Gnu" limousine

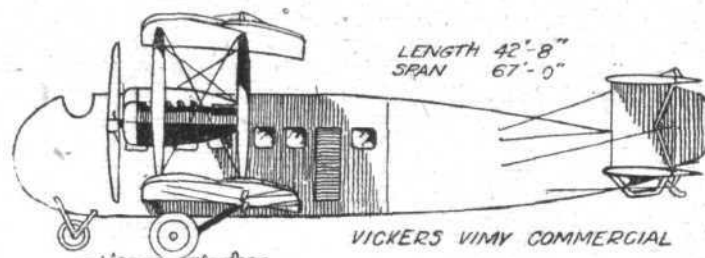


pilot and observer, machine gun, and 43 gals. of extra petrol giving the machine a range of 600 miles.

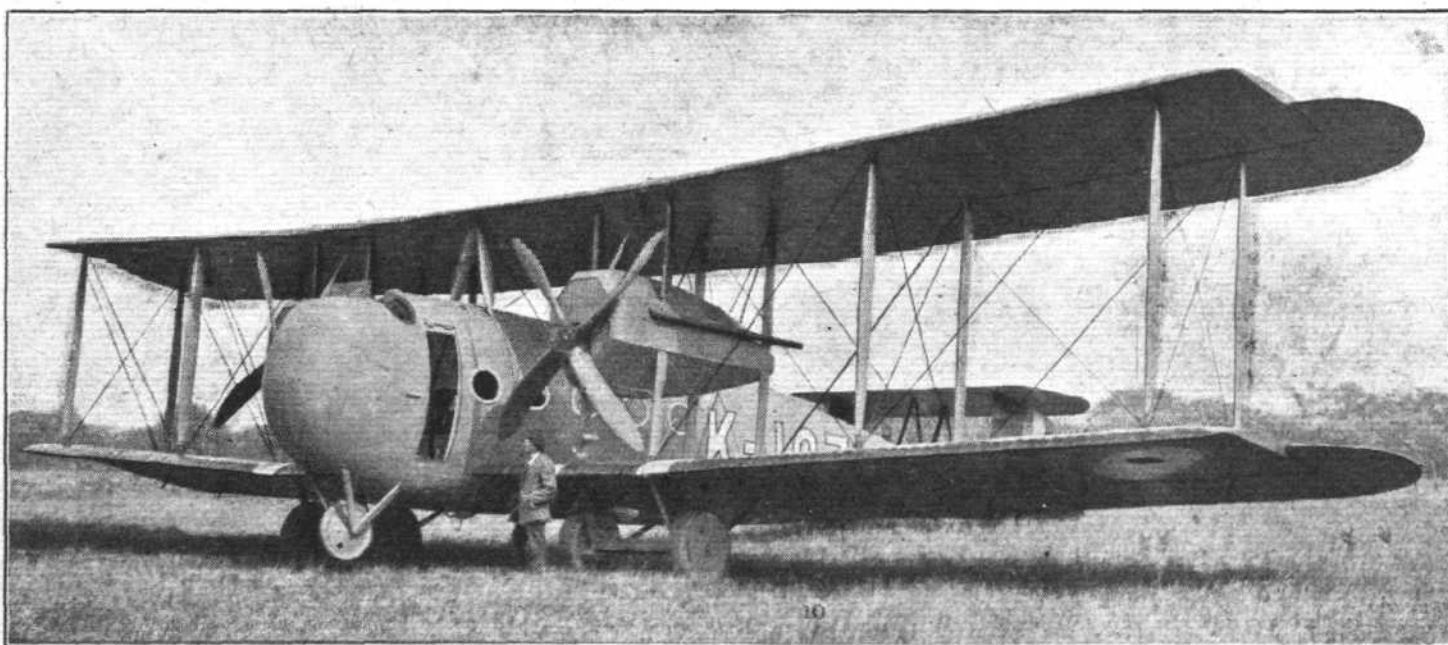
This machine can very easily be converted into a school machine, carrying two pupils and pilot, by fitting a second set of controls built in one complete unit for the purpose. Fifteen minutes to half-an-hour is sufficient time to make this change, and when required the extra control can be supplied as an addition to the standard machine.

In the commercial model one passenger is located forward in a separate cockpit, behind which is another seating two passengers side by side, the pilot's cockpit being behind this, level with the leading edge of the lower plane. If required, a cabin may be fitted for use in rough weather, which completely protects the passengers from rain, etc. The hull, of mahogany, cedar and rock elm, is of circular construction with "built-on" fore and aft "V" steps, either of which can be replaced in case of damage. The planes are made to fold forward to facilitate housing. The tail is of the biplane type, the top surface having a negative camber. A small water-rudder is fitted which controls the machine at all speeds on the water. Several novel features are embodied in the control. Immediately above the pilot's cockpit is a crank handle, by means of which, through special control of switches and starting magneto, the engine may easily be started. The engine is a 160 h.p. Beardmore mounted on ash and steel supports midway between the planes and driving a pusher screw. The

cargo, mail, or luggage. A separate door in the port side enables the cargo to be loaded or unloaded without inconveniencing the passengers in the slightest. For long non-stop flights two pilots may be carried, and dual control is fitted as standard.



Should it be desired to use the machine as a cargo carrier, this can easily be done by removing the seats, when the cabin affords a roomy space for goods and merchandise. The capacity of the Vimy-Commercial when thus fitted is 1½ ton. It will therefore be seen that quite a considerable cargo can be transported by air at the—comparatively—high speed of 100 m.p.h. The machine has an endurance of five hours, and the petrol consumption is 35 gallons per hour.



Three-quarter front view of the Vickers-Vimy Commercial

radiator is in front. By sacrificing one passenger the machine can be fitted out with Amphibian landing gear. This gear lifts well clear of the water and can be lowered and raised into position by the pilot during the flight.

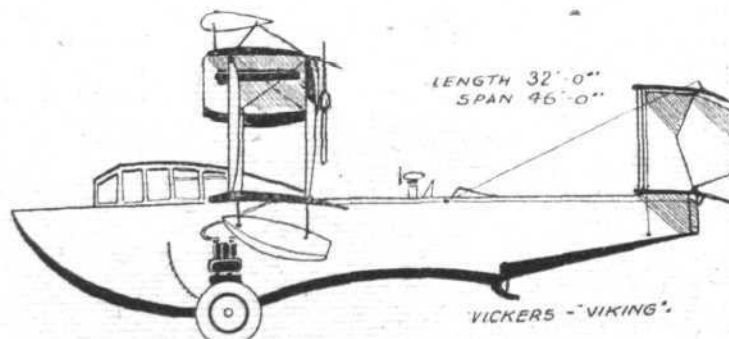
Vickers, Ltd. (STAND 50)

Vickers House, Broadway, Westminster, London.

THE exhibits of this famous armament firm will be very numerous, including as they do a large variety of accessories and models in addition to the two full-size machines shown. One of these will be the famous "Vickers-Vimy-Commercial," of which a large number have been ordered by the Chinese Government. This machine is not a new type, inasmuch as it was already in existence last year, but it has the advantage of being well tried out. It was a machine of this type, it may be remembered, which was flown from London to South Africa, and the type is in regular use on the "Instone" Continental air service. Since its first inception the Vimy-Commercial has been altered and improved in several respects. The large cabin, with seating accommodation for 9-10 passengers, is built upon the famous Saunders "Consuta" principle, with the layers of plywood sewn together, a form of construction which has proved very strong and durable. This construction also has the advantage that there is no internal cross bracing in the cabin, which is, therefore, particularly roomy and comfortable. There are eight wicker seats arranged along the sides of the cabin, and a ninth wooden seat is placed on the starboard side, opposite the entrance door.

The pilot's cockpit is entered through two doors in the forward bulkhead of the cabin, and below this is a space for

There is little doubt that the "Viking" amphibious machine to be exhibited by Messrs. Vickers, Ltd., will cause considerable interest, not only on account of its combination landing gear, which allows it to alight on and start from either land or water, but also because, as a flying-boat, this



machine represents a departure from standard practice, its hull design being considerably out of the ordinary. The flying-boat hull of the "Viking" has a pronounced Vee bottom both forward and aft of the step. Two retractable land wheels are mounted one on each side of the boat. These are operated from the pilot's cockpit, and can be raised and lowered during flight. If, therefore the machine is used, as it would be, chiefly over sea, but has to make land going journeys in the course of its duties, it is able, should necessity arise, of alighting safely on an ordinary aerodrome.



An amphibious flying boat—the Vickers "Viking"

A "conservatory" roof is fitted over the top of the boat, inside which the three passengers and two pilots are comfortably housed. If it is desired to use the boat for cargo carrying, three of the seats can be removed, when a space of 76 cu. ft. is available for commercial load. The engine, a 360 h.p. Rolls-Royce "Eagle," Mark VIII, is mounted high in the gap between the planes, and drives a small diameter four-bladed air-screw (pusher). The "Viking" has an overall length of 32 ft. and a span of 46 ft. Fully loaded, in flying trim, the weight is 4,545 lbs.

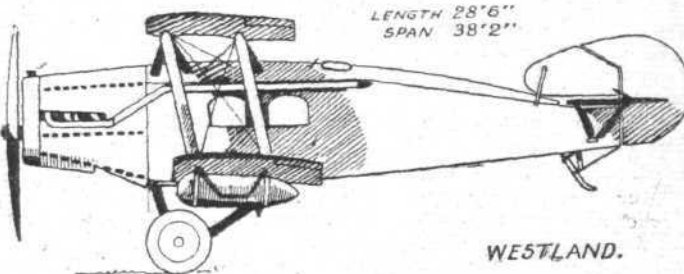
In addition to the two full size machines Messrs. Vickers will exhibit a series of very interesting scale models, and there will also be a large display of accessories such as pumps, valves, petrol cocks, etc., while the Barrow works will show a 10-ft. model of a passenger airship, a model of a mooring mast, and samples of "Duralumin" aeroplane spars. The Sheffield works will show a representative selection of aero engine parts, while the Small Tools Department will exhibit drills, reamers, milling cutters, etc. Not the least interesting exhibit on the Vickers stand will be a large route map indicating the routes followed on the flights from Newfoundland to Ireland, London-Australia, London-Cape-Cairo, London-Amsterdam, and London-Madrid.

Westland Aircraft Works. (STAND 61)
Yeovil, Somerset.

THE Westland Exhibits will consist of a Mark II. "Westland Limousine" which is a modified form of the Westland Rolls-Royce "Limousine" exhibited at the Paris Show.

The Mark II. model is fitted with a 300 h.p. Hispano-Suiza engine in place of the Falcon III. Rolls-Royce, and the petrol tanks have been removed from inside the fuselage and replaced by two torpedo-shaped tanks, each of 29 gallons capacity, which are now carried underneath the lower planes. By this means considerably greater cubic space is available

in the cabin, and this extra space can be utilised for the carriage of mails or goods. In addition to this, the machine is better from the point of view of fire, as in the event of a crash there is no possibility of petrol being poured over the engine. Between the engine and the fuselage a perfectly fire-proof bulkhead, covered with aluminium and asbestos, is fitted. The whole machine has been strengthened so that a load of three passengers plus 230 lbs. goods can be carried with a loading of 8.7 lbs. per square foot. Various small modifications have been made inside the cabin to increase the comfort of the passengers. The increased petrol capacity



gives a flight endurance of $4\frac{1}{2}$ hours and a cruising speed of about 90 m.p.h., which makes the machine eminently suitable for Continental services. In addition to the complete machine a fuselage under construction will be exhibited which shows how the very rigid structure is obtained together with lightness. This fuselage is quite standard and will show the type of workmanship put into the Westland machines. Probably a few components such as tanks, etc., will be shown. Some coloured photographs of the various Westland machines will also be exhibited together with models of the Rolls-Royce engine limousines.



The Westland Limousine, Mark 2, fitted with 300 h.p. Hispano-Suiza engine

AERO ENGINES AT OLYMPIA.

It is probably true that there will be less in the way of novelties to be seen in the aero engine section of the Olympia Aero Show than there is as regards new aeroplanes. At the moment there is hardly sufficient demand for commercial aero engines to justify manufacturers in launching out with ambitious engine programmes. Nevertheless, if the majority of the aero engines which will be exhibited at Olympia are well known to those who have had an opportunity of following closely, also during the War, engine development, the exhibition will, for the first time since 1914, enable others who have not had this privilege to study in detail many of the aero engines which have made history during the last few years, and many of which will doubtlessly continue to make history—commercial history—during the years to come. From this point of view, therefore, the aero engine section should be well patronised, and will be extremely well worth while to anyone in the slightest interested in this branch of aircraft manufacture and design.

Armstrong-Siddeley Motors, Ltd. (STAND 51)

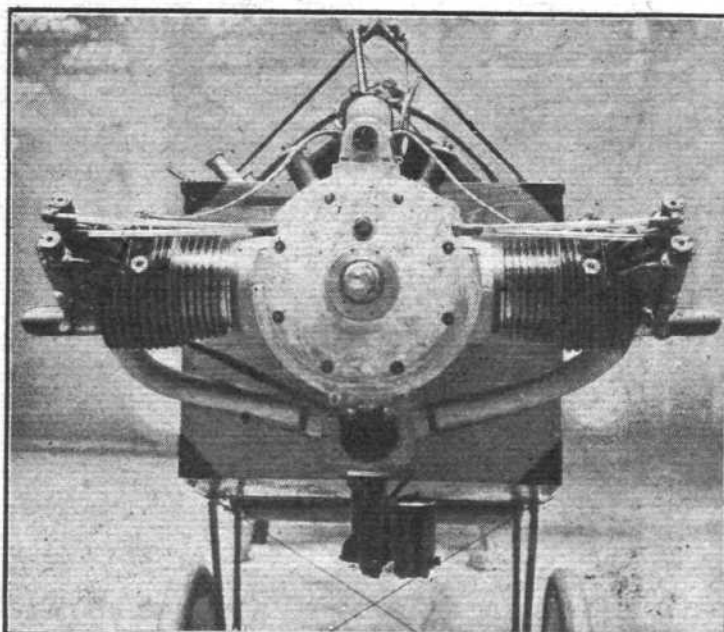
Coventry

EXAMPLES of five different models will be shown by this firm. The first is the well-known Siddeley "Puma" engine. The six cylinders, which are in two blocks of three, have a bore of 5.7 ins. and a stroke of 7.5 ins. The steel barrels are screwed into a common aluminium head for the block. There is one inlet and two exhaust valves for each cylinder. The petrol consumption is 17 gallons per hour. The oil consumption is 10 pints per hour, the oil being supplied through the half of a double pump to the crankshaft bearings. The return is through the lower half of the pump from the centre of the oil base. Dual ignition is supplied either by two magnetos or by one magneto and one Remy set. The total weight, including the ignition and propeller boss, is 636 lbs. The overall measurements are as follows:—Breadth, 24 ins.; height, 41 ins.; length, 70 ins.

The next model to be shown is the Siddeley 500 h.p. "Tiger" water-cooled aircraft engine. This has 12 cylinders in two lines of six at an angle of 60 degs. They consist of steel barrels screwed into aluminium heads with two inlet and two exhaust valves per cylinder. The bore is 6.3 ins. and stroke 7.1 ins. The b.h.p. at 1,500 r.p.m. (the normal speed of engine at full speed of aeroplane) is 500. The petrol consumption per hour is 35 galls., and the oil consumption 20 pints per hour. The ignition is by two twelve-cylinder magnetos; and a starting device is provided in the form of an electric starter motor mounted on the crankcase with automatic friction clutch gear. The oil is supplied by a main pump to a triple distributing pump which feeds three of the main bearings of the crankshaft. The oil passes to the crank pins and back through the remaining four main bearings to the sump. Two return pumps are fitted, one at each end of the crankcase. The propeller is driven at a reduced speed (835-1,500), to ensure efficiency and to make the unit suitable for large aeroplanes adapted for any purpose. The overall measurements are:—Breadth, 34 ins.; height, 40 ins.; length, 82 ins.

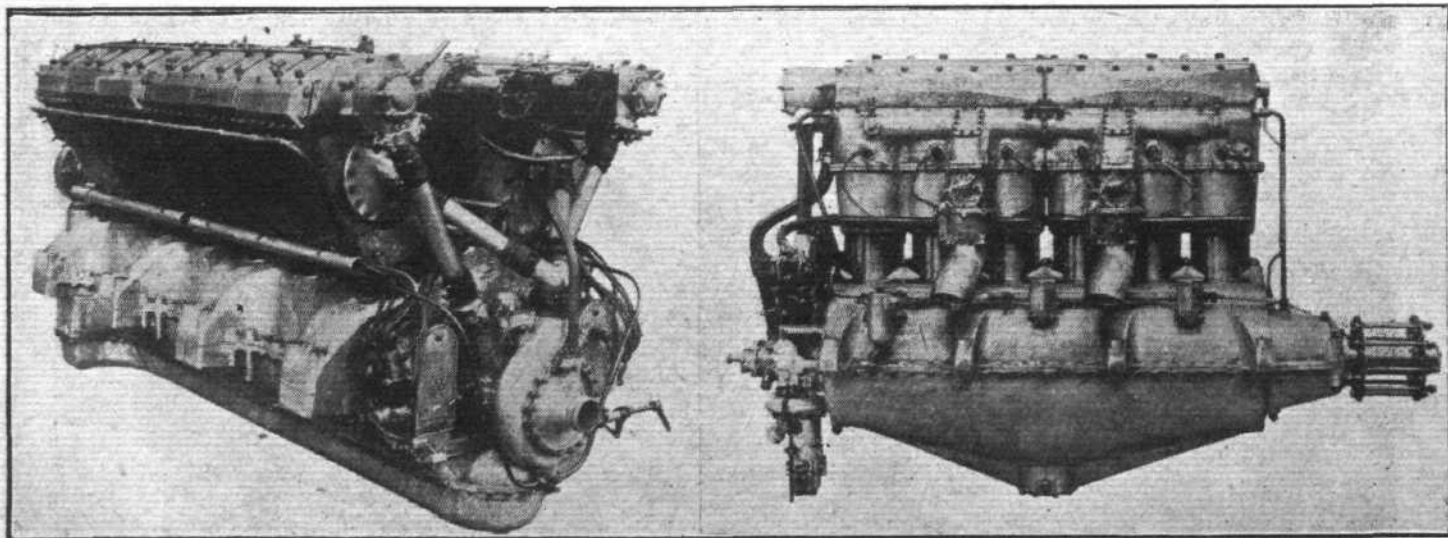
Three more recent models will also be shown: a twin-cylinder air-cooled engine, and two Radial air-cooled engines—one of 150 h.p. and the other of 300 h.p. The twin-cylinder air-cooled engine develops 45 b.h.p. at 1,600 r.p.m.—the normal speed of engine at the full speed of aeroplane. The cylinders consist of steel barrels screwed into aluminium heads and fixed to the crankcase by a special device which enables them to be easily detached. The bore is 5 ins. and the stroke 5 ins., and there is one inlet and one exhaust valve per cylinder. The petrol consumption per hour is

3.5 galls., and the oil consumption is 2.5 pints. The lubrication is by dry sump and double oil pump. Dual ignition is provided by magneto and Remy ignition set. Roller bearings are used for the crankshaft and roller or ball bearings are used throughout other parts of the engine, which is supported by four feet built as part of the crankcase. The overall dimensions are:—Breadth, 39.5 ins.; height, 24.5 ins.; length, 20.5 ins.



The 45 h.p. Armstrong-Siddeley two-cylindered opposed aero-engine

The smaller of the two Radial air-cooled engines—the 150 h.p.—is intended for commercial purposes. It has seven cylinders, consisting of steel barrels screwed into aluminium heads. The bore and stroke are both 5 ins. and 150 b.h.p. is developed at 1,500 r.p.m. One inlet and one exhaust valve are provided per cylinder, and the cylinders are fixed to the crankcase by a special device which enables them to be easily detached. The lubrication is by double oil pump.



ARMSTRONG-SIDDELEY AERO ENGINES: On the left the 12-cyl. 500 h.p. Tiger, which is of similar construction to the 6-cyl. "Puma" seen in the right-hand photograph

The ignition is dual—by magneto and Remy ignition set. Roller bearings are used for the crankshaft and roller or ball bearings are used throughout the rest of the engine. The engine, which is supported by four feet carried well behind the crankcase, is fitted with a distributor for compressed air starting. All accessories are mounted on the front of the engine, and can be easily dismantled without removing the engine from its bed. The total weight is 390 lbs., or with the exhaust manifold (a ring built up in five sections) 415 lbs. The overall diameter is 42 ins. and length 33.5 ins.

In the 300 h.p. Radial engine, which provides power combined with lightness and reliability, many of the details are similar to those of the 150 h.p. model. The cylinders are fourteen in number in two rings of seven. The bore and stroke are 5 ins., the petrol consumption is 20.5 galls. per hour, and the oil consumption 18 pints per hour. The total weight is 680 lbs., or with exhaust manifold 720 lbs. The overall dimensions are as follows:—Diameter 42 ins.; length, 41 ins.

Dudbridge Ironworks, Ltd. (STAND 52)

Stroud, Gloucestershire.

We regret that at the moment of going to press no particulars are available of the engines to be exhibited by this firm. The firm has, however, in the past been associated with the manufacture of Salmson (Canton Unne) engines, and it may be expected that their exhibits at this year's show will consist of engines of this type.

Gwynne's Engineering Co., Ltd. (STAND 55)

Hammersmith.

This firm will represent the rotary type of engine with a display of Clergets and B.R.2. Of the former three different types will be shown. One of these is the 11 E.B. of 1917,

already well known, having done a great amount of excellent work during the War, when it was used in large quantities. It has a bore and stroke of 140 by 180, and develops 230 h.p. at 1,300 r.p.m. The weight is somewhat less than that of the 11 E.B. Clerget of the same power, i.e., 498 lbs., or 2.16 lbs./h.p. As the only representative of the rotary type of aero engine at the show, Messrs. Gwynnes, Ltd., should be certain of a large number of visitors at their stand, especially as this will be the first time many of the visitors have an opportunity of examining at close quarters the famous B.R.2 and the new 9J engines.

La Hispano-Suiza. (STAND 54)

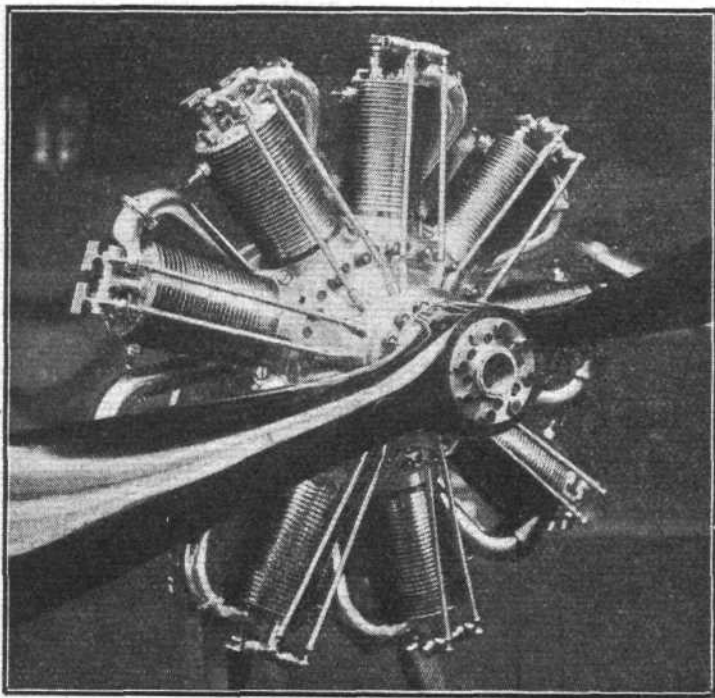
Bois-Colombes, Seine, France.

We regret that, up to the time of going to press, it has not been possible to obtain from this firm any particulars of the engines to be exhibited. It may be taken for granted, however, that there will be a considerable array of Hispano-Suiza engines of different type. It may be recollected that at the Paris Aero Show towards the end of last year a great number of Hispanos were shown, ranging from the earliest to the latest models, and including several engines of great historical interest. Probably the exhibit at Olympia will be of a very similar nature.

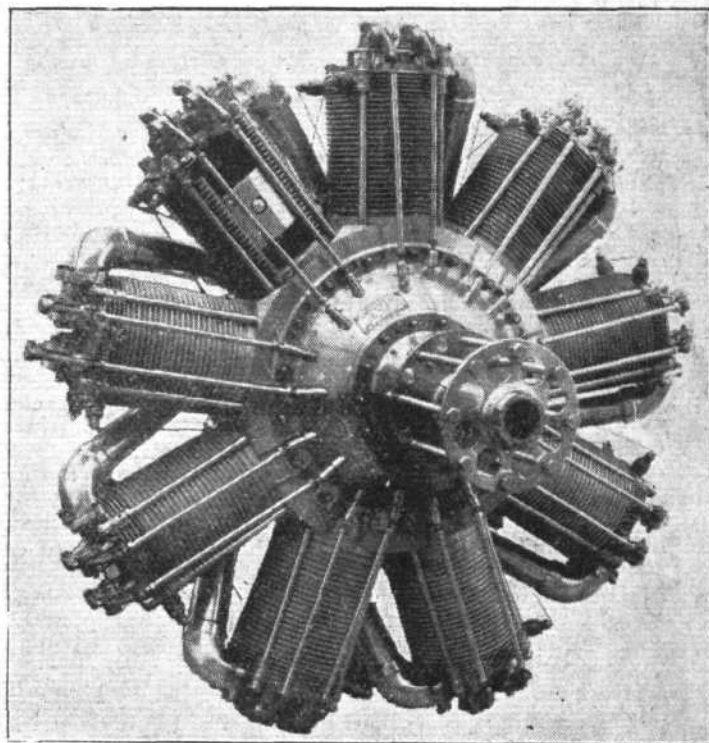
D. Napier and Son, Ltd. (STAND 57)

14, New Burlington Street, London, W.1.

It was unfortunate that, owing to Napier's being engaged on other important Government work, the Napier Lion aero engine was not produced in sufficient quantities to be of service to the country during the War. Since the Armistice, however, it has amply demonstrated its capabilities, and has been fitted in several record-breaking machines. It may be remembered that one of these engines has reached an



The Clerget 9-cylinder, type 9J, rated at 110 h.p., built by Gwynnes, Ltd.



The 230 h.p. B.R.2 aero engine, built by Gwynnes, Ltd.

which develops a power of 230 h.p. at 1,300 r.p.m. This engine is mainly of historical interest, and is now superseded by the B.R.2 of the same horse-power. The next engine is a type 9 B.F. 9-cyl. Clerget, with a bore and stroke of 120 and 172 mm. respectively. The average effective power of this engine is 146 h.p., at 1,250 r.p.m. The most up-to-date engine of the Clerget type to be shown on this stand is a 9 cyl. of about 110 h.p. This engine shows several innovations in design, notably in the shape and arrangement of the induction pipes, which leave the circular crank-case to the rear of the spaces between adjoining cylinders, and are given, near their outer end, a pronounced lateral bend. At this point they are provided with flange couplings instead of going direct to the valve cages, as was the case in earlier models. The weight of the 9J is 250 lbs., or 2.5 lbs./h.p. The petrol consumption is 0.7 pts./h.p./h., and the oil consumption 0.13 pt./h.p./h. Finally, Messrs. Gwynnes, Ltd., will show a B.R.2 rotary engine. This type is, of course,

altitude of 30,500 ft. It was also a Napier Lion which won the Aerial Derby of 1919, installed in an Airco biplane. On a somewhat similar Airco machine the Napier secured twenty-three British records, eighteen of which being attained in one afternoon.

Again, in a Handley-Page W8 biplane fitted with two Napier Lion engines a British record was established recently by going to a height of 14,000 ft. with a load of 3,690 lbs., or the equivalent of about twenty-six passengers. Several extremely notable flights stand to the credit of the Napier Lion, but sufficient has, we think, been said to indicate the amount of success which this engine has attained since its first appearance. The engine has already been described in this Journal (March 27, 1919), but since then several improvements have been effected.

Thus its self-starting arrangements were effective enough for all but the coldest weather. However, these days of commercial flight demand a slightly larger margin of power, as

well as more directly mechanical methods of starting, to say nothing of the elimination of as many "olives" and the like joints as possible.

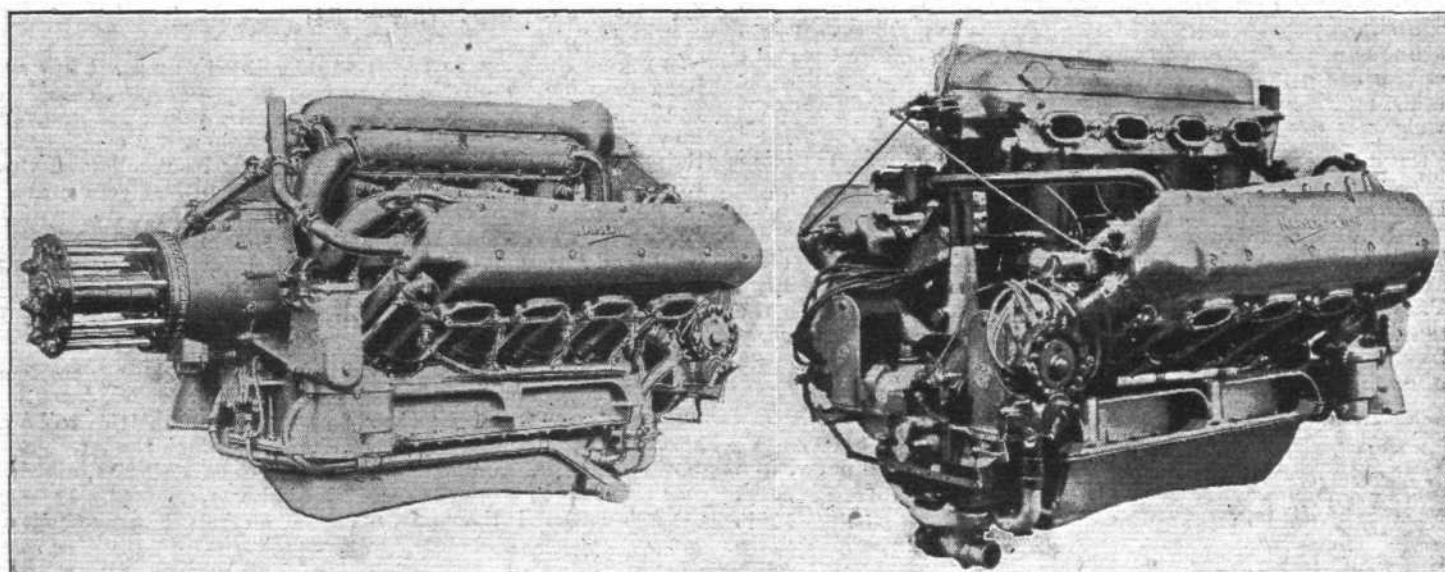
All this has now been achieved. In the first place the power has been increased to 500 h.p. by slightly increasing the cylinder bore to $5\frac{1}{2}$ ins., and the monobloc construction of the cylinder banks—which even a year ago was in question—has for a long time been definitely abandoned in favour of unit practice with sheet steel applied water-jackets for the

starting motor is used, of course the mixture dosing becomes superfluous. We are, however, in a position to say that even the 500 h.p. "Lion" by no means represents the final effort of its makers.

Rolls-Royce, Ltd. (STAND 53)

14, 15, Conduit Street, W. 1.

THE Rolls-Royce engines to be shown will be a collective exhibit of some of the greatest successes in the world's history of aviation in both war and peace.



Two views showing the general arrangement of the 450 h.p. Napier aero engine

cylinders and monobloc detachable heads as before, the water inlet being duplicated to the heads and to the cylinder jackets; the flow in the latter case being continuous through short connections.

The connections from the gas starter are now made through flexible tubing welded to the central distributing drum and to light flanged connections to the cylinder blocks, so that slackening off a couple of nuts from each of the latter enables the whole part to be immediately dismantled. The vaporiser pump, too, is now fed direct from a flexible pipe connection eliminating the previous float chamber feed.

As for the starting, this is now alternatively by electric motor or by hand, with the same gear mechanism in each case, and is effected by a dog clutch sleeve with off-set faces on the teeth to give an easy cast-off as soon as the motor starts, practically in the same manner as in a motor-car engine. This sleeve is freely mounted on the tail extension of the crankshaft, but is externally splined so as to carry, yet slide freely through, a worm wheel which is rotated by a worm spindle carrying the driven one of two encased spur gears. This spindle extends through the casing at either end, and is so formed that a starting handle can be applied to either end. When, however, it is desired to use the electric starting motor, the cover of this worm spindle casing is lifted off, and the motor, with its driving spur pinion, substituted and secured in place.

However, to apply the sleeve dog-clutch and at the same time to allow for its automatic cast-off, an ingenious method is employed. The starting lever is so jointed to the pivoted clutch-moving fork that about $\frac{1}{4}$ -in. of the end of the latter rises upwards from within the joint attachment. Upon this $\frac{1}{4}$ -in. extension bears a plunger, mounted with a 300-lb. spring behind it, within the hollow starting lever itself. It will thus be seen that, since the lever is also pivoted, the action of this spring and plunger practically constitutes the strongest and most effective toggle-joint motions upon either side of that $\frac{1}{4}$ -in. projection within the joint; so that while in one position of the lever the clutch sleeve is, so to say, snapped into engagement, and so held by the bearing of the plunger upon the front face of the projection, the instant the motor starts and casts off the clutch, the movement of the fork presses up the spindle against the spring pressure and transfers it to the rear face of the projection, and so holds the clutch permanently out of engagement.

When the mechanical starter only is used, the mixture distribution is employed as before, to the accompaniment of the easing open of the inlet valves by the same system as we described on March 27, 1919. When, however, the electric

The exhibit will contain one of each of the four types of aero engines which bear the name of Rolls-Royce. These are as follow:—

A 100 h.p. 6-cylinder engine—the "Hawk." From the commencement of 1918, when airships, which were of such great use for spotting and destroying submarines and protecting our Navy and Mercantile Marine, were first brought into service, up to the time of the Armistice, no less than 36,000 miles were flown with Rolls-Royce "Hawk" engines installed. Some flights of extraordinary length stand to the credit of this engine. In one case, in August, 1918, a flight was made of 50 hours 55 minutes' duration. Other flights of from 25 to 30 hours were not uncommon.

This type of engine is little known outside the Air Forces.

It was also used for training pilots during the War.

The 275 h.p. 12-cylinder "V" type of engine—the "Falcon," is the engine that made the Bristol Fighters so famous during the War. From August 4, 1914, up till the day of the Armistice, November 11, 1918, 1,524 complete Bristol Fighters had been delivered to the Air Services, and of these no less than 1,364 were equipped with Rolls-Royce 275 h.p. engines. To relate even a portion of what this engine has accomplished would take far more space than could be provided for the purpose, and the above figures must therefore be allowed to speak for themselves as an indication of the esteem in which this engine was held by the Air Ministry.

To the "Falcon" stands the credit of having accomplished a journey from London to Paris in 75 minutes. This journey was made on April 8th, 1919, in a Martinsyde aeroplane, and works out at an average speed of 172 m.p.h. This would appear to be the fastest trip that has yet been made from London to Paris.

The 360 h.p. 12-cylinder "V" type of engine—the "Eagle," is perhaps the most famous aero engine in the world, and one which has made history, and provided the principal milestones in the progress of aviation. During the War, the "Eagle" was fitted in the Handley Page long-distance Bombers, which were the terror of the enemy. During the latter part of the War, up to Armistice day November 11, 1918, Messrs. Handley Page delivered 122 complete twin-engined bombers to the Air Forces, and of these all but nine were equipped with two or more Rolls-Royce 360 h.p. "Eagle" engines.

It was one of these machines which flew from London to Constantinople, where it bombed the Turkish War office, also the enemy warship, the "Goeben." Another of these

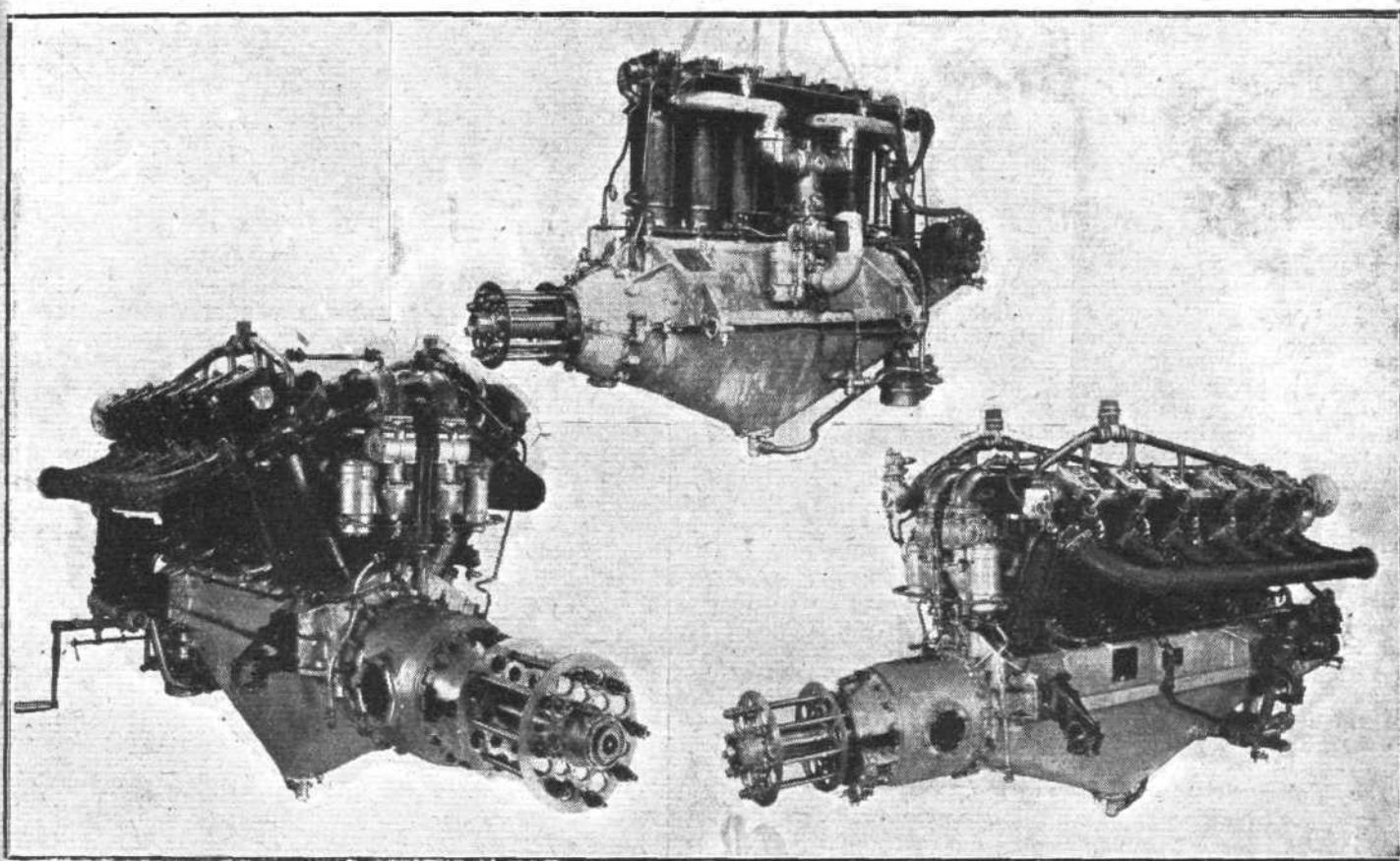
machines flew to Egypt, took an active part in the Palestine campaign, and subsequently went on to India. This journey was shortly afterwards accomplished by another Handley Page machine, with four Rolls-Royce 360 h.p. engines.

This engine was also used exclusively in the London-Paris-London air services in connection with the Peace Conference, for the conveyance of British and Allied ministers, officials, despatches, etc. It is pleasing and satisfactory to note that the reputation for reliability of the Rolls-Royce aero engine caused it to be selected for this most important occasion.

The Sunbeam Motor Car Co., Ltd. (STAND 56)

Wolverhampton.

THIS firm will have the largest collection of aero engines at the exhibition, no less than eight different types of engines being shown. These are as follows: "The 'Dyak,' a 6-cyl. 100 h.p. engine specially designed for airship work. The 'Arab,' an 8-cyl. direct drive engine of 200 h.p., suitable for high-speed aeroplanes. The 'Maori 4,' a 12-cyl. engine of 275 h.p., specially designed for airship use. The 'Manitou,' 12-cyl. 350 h.p., an engine suitable for



A TRIO OF ROLLS-ROYCE ENGINES : On the left, the 300 h.p. "Eagle," the first aero engine designed by Mr. F. H. Royce. On the right, the 275 h.p. "Falcon," which is a smaller edition of the "Eagle," and above it the 100 h.p. "Hawk" which has been largely used for airships and in aeroplanes for training purposes

Since the Armistice, the great historical flights accomplished by the Rolls-Royce "Eagle" engine are the first and only direct aeroplane flight across the Atlantic, the first and only flight from England to Australia, and the first and only flight from England to South Africa. The Atlantic flight was accomplished—a distance of 1,890 miles—in 15 hours 57 minutes, which gives an average speed of 118 m.p.h. The great flight to Australia, which was over a distance of roughly 11,500 miles, was accomplished in the nett flying time of approximately 124 hours. The machine making this flight subsequently flew to Adelaide via Charleville, Sydney and Melbourne, bringing the total mileage up to approximately 16,000 miles. In the South African flight, a distance of 6,271 miles was flown, including a non-stop flight across the Mediterranean of over 14 hours' duration. These three historical flights were accomplished with Vickers' aeroplanes.

The "Eagle" engine is now making history on the Continental air service in the Handley Page machines. Since September last, no less than 65,000 miles have been covered in flights between London and Paris, and London and Brussels. Over 1,200 passengers have been carried, not including pilots, and 50,000 lbs. of freight, not including about 30,000 lbs. of passengers' luggage.

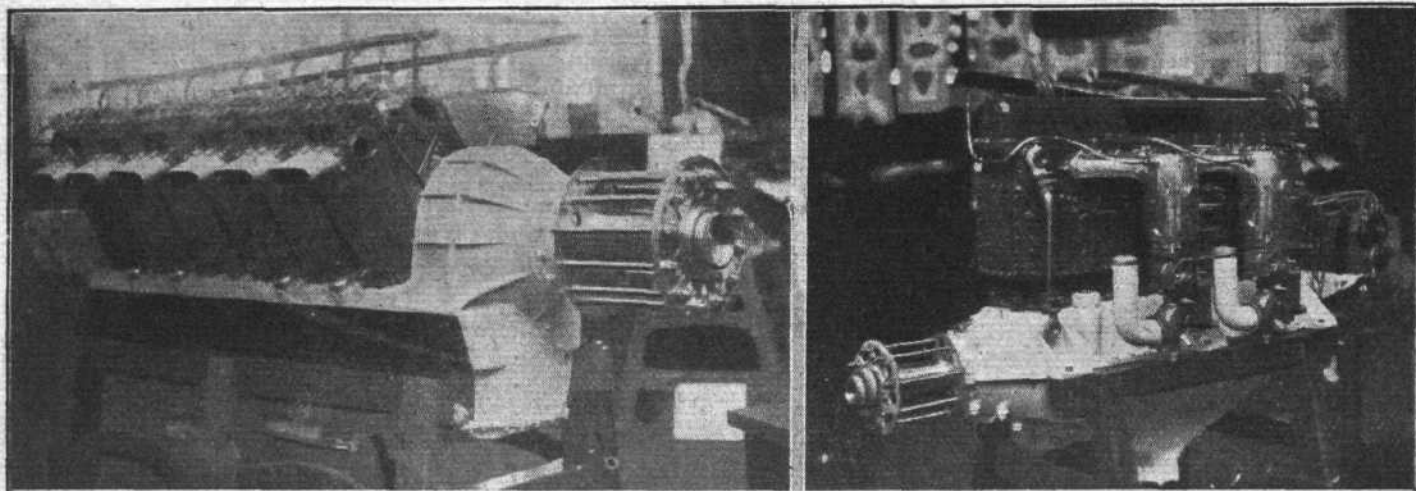
A 600 h.p. 12-cylinder "V" engine—the "Condor," designed by Mr. Royce, is the latest development of aeronautics. It is being manufactured at the request of the Government, who realise the necessity of being pre-eminent in the air, and who require a reliable engine of this vast horse-power for carrying great weights for long distances.

aviation purposes of all kinds. The "Cossack 3," a 12-cyl. engine of 350 h.p., specially designed for use in airships. The "Matabele," 12-cyl. 400 h.p., an engine suitable for aviation purposes of all kinds. The "Sikh," 6-cyl. 400/450 h.p., and the "Sikh," 12-cyl. engine of 800/900 h.p.

The Sunbeam "Dyak," 100 h.p., is of the vertical type, having six cylinders in one row, and cast *en bloc*. The valves, two to each cylinder, are operated by an overhead camshaft. The hollow crankshaft is carried by seven die-cast white-metal bearings lubricated by a compound pressure system. The airscrew is mounted direct on the crankshaft, which is fitted with a thrust bearing for the purpose of taking the thrust of the airscrew. The bore and stroke of the "Dyak" are 120 and 130 mm., respectively, and the power is 100 h.p. at 1,200 r.p.m. The weight of the engine in running order, but without fuel or oil, is 439 lbs.

The Sunbeam "Arab," 200 h.p., fitted as it is with direct drive, is suitable for high-speed aeroplanes. It is of the Vee type, having eight cylinders cast in two blocks, the blocks being placed at an angle of 90 degs. There are three valves per cylinder—one large inlet and two exhaust valves, operated by two overhead camshafts. The engine may be adapted either for hand or electric starter. The bore and stroke are 120 and 130 mm., and the power developed at the normal revs. of 1,600 r.p.m. is 200 h.p. At 2,000 r.p.m. the power is 240 h.p. The weight in running order, but without fuel and oil, is 562 lbs.

The Sunbeam "Maori," 275 h.p., has been especially designed for airship use. It is of the Vee type, with twelve cylinders in two rows of six each, placed at an angle of



A CONTRAST IN SUNBEAMS: On the left the 800 h.p. Sikh, and on the right the 100 h.p. Dyak

60 degs. There are four overhead valves to each cylinder, operated by two camshafts (overhead) to each row. It might be mentioned that a flywheel is fitted to these engines, and a further feature not usually found on aero engines is a governor which automatically cuts off the ignition when the engine speed reaches 2,500 r.p.m., or when the oil pressure falls below 20 lbs./sq. in. The cylinders have a bore of 100 mm. and a stroke of 135 mm., and the power developed at the normal engine speed of 2,100 r.p.m. is 275 h.p. The weight, without water, fuel or oil, is 920 lbs.

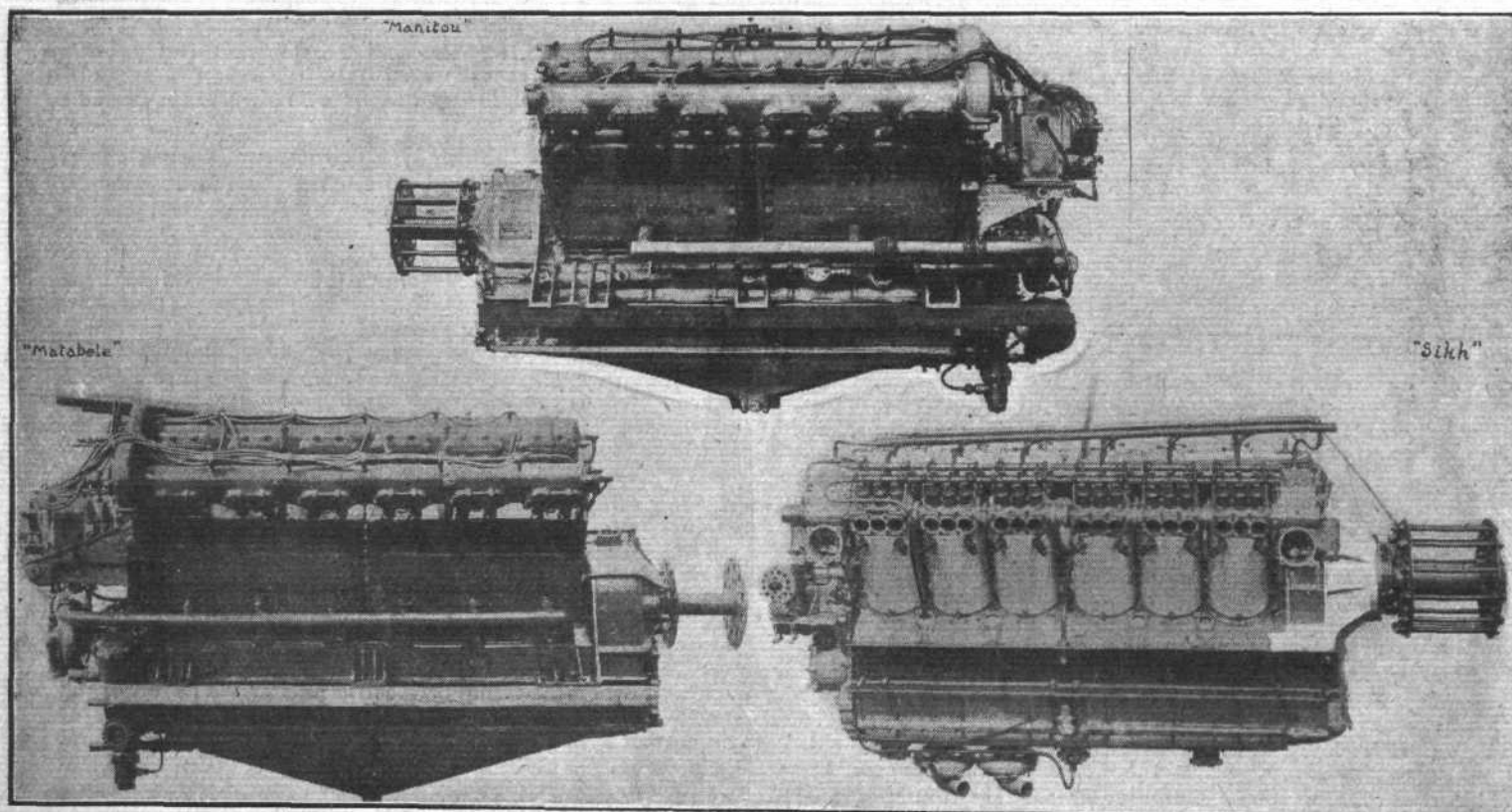
The Sunbeam "Manitou," 300 h.p., is suitable for all general purposes, such as aeroplanes, seaplanes, and large or small airships. It is of the Vee type, with its cylinders cast in blocks of three, and disposed on the crankcase in two rows of six each, placed at an angle of 60 degs. The valves, of which there are four per cylinder, are operated by two overhead camshafts. In this model the airscrew is indirectly driven, through a reduction gearing, the propeller shaft being mounted on an extension of the crankcase. The cylinder dimensions are 110 by 135 mm. and the normal power of the engine is 300 h.p. at 2,000 r.p.m. The weight in running order is 904 lbs.

The Sunbeam "Cossack 3," 350 h.p., has been especially designed for airship work, and was used in the airships R. 37,

R. 38 and R. 39. It has twelve cylinders, 110 by 160 mm., set in two rows of six each at an angle of 60 degs. The cylinders are cast in blocks of three, and each cylinder has two inlet and two exhaust valves, operated by overhead camshafts, one to each set of valves. The camshafts are driven by means of a train of gears from the crankshaft. A special arrangement is made for the exhaust to be water cooled, and this engine, like the "Maori," is fitted with a governor. The engine develops 350 h.p. at 2,000 r.p.m. and weighs 1,200 lbs. without water.

The Sunbeam "Matabele," 400 h.p., is a general purpose engine, suitable for either aeroplane, seaplane, or airship. The cylinders, 122 by 160 mm., are cast in blocks of three, the angle between opposite banks being 60 degs. As in several of the other models there are four valves per cylinder, operated by overhead camshafts. The rated power of 420 h.p. is delivered at a speed of 2,000 r.p.m., when the propeller speed is 1,225 r.p.m. The weight of the engine in running order, but without fuel and oil, is 1,091 lbs. The petrol consumption is .54 pint per b.h.p. per hour. Both compressed air starters and hand starters are fitted to this engine.

Next in size comes the 400-450 h.p. 6-cyl. "Sikh," a vertical engine with separate cylinders. This engine is



A TRIO OF SUNBEAMS: Above, the 300 h.p. Manitou. On left, the 400 h.p. Matabele, and on the right, the 800 h.p. Sikh

suitable for either airships or large aeroplanes. The cylinders have 6 valves each, three inlet and three exhaust, operated from a single camshaft through push rods and rockers. The camshaft is enclosed in the crankcase, and is driven by a train of gears. With six cylinders, 180 by 210 mm., and running at a speed of 1,400 r.p.m., the engine develops 425 h.p.

The Sunbeam "Sikh" 12-cyl. 800-900 h.p. is a larger version of the engine previously described, having twelve cylinders disposed in Vee formation, at an angle of 60 degrees. The cylinders again are separate, and any one cylinder may be easily removed without affecting the timing of the engine. As in the vertical type there are six overhead valves per cylinder, and these are operated by push rods and rockers from a single central camshaft, which is housed in the crankcase within the Vee and driven by gearwheel direct from the crankshaft. A feature of the design is the accessibility of the cam gear, it being only necessary to remove the cover at the timing end to enable the camshaft to be drawn out clear of the engine. The power is 850 h.p., at a speed of 1,400 r.p.m., at which engine speed the propeller speed is 920 r.p.m. The weight of the "Sikh" complete, but without water, fuel or oil, is 1,952 lbs.

Louis Breguet. (STAND 26)

Paris.

THIS firm has not been able to complete in time for the Show the new giant Breguet "Leviathan" which is now in course of construction at the works of this French firm. The machine, of which a scale model will be exhibited at the Show, has been designed to utilise the Breguet-Bugatti power unit exhibited at the Paris Aero Show. This power unit, it will be remembered, consists of two double Breguet-Bugatti engines placed end to end, and one slightly higher than the other. Each engine consists of two banks of eight cylinders placed vertically and side by side. This arrangement has

The Zeitlin Engine Co. (STAND 61a)

222, Strand, W.C. 2.

No aero show is counted complete without at least one unorthodox engine design. This year's is provided by the variable-stroke Zeitlin engine.

The chief characteristic of the engine is that the four strokes of the working cycle are each arranged to be of different length so as to get nearer the ideal cycle for aero work and greatly simplify the engine. Bore, 135 mm.; working stroke, 181 mm. long; exhaust stroke, 203.5 mm.; induction stroke, 226 mm.; compression, 203.5 mm. The induction stroke is divided in the two distinct stages, viz., the entry of fresh air through the exhaust valve, followed by the period of vaporised mixture admitted through large ports during a period of over 88 degs. of rotation (as against the usual 40 degs). The extra supply of air in the induction stroke is sufficient to give full power at high altitudes. At ground level and low altitudes, by very simple means, which are under the complete control of the pilot, part of the top layer of air is rejected before compression. The amount of air rejected is varied in accordance with altitude.

Weight per brake h.p. is less than 2 lb.

It is also impossible for this engine to back-fire.

two running. There is thus, it is claimed, little likelihood of a forced landing *en route*. If this proves to be borne out in practice a great step forward has been made in commercial aviation, since the forced landing is one of the greatest dangers of a long journey, especially in thick weather.

The accompanying diagram shows the general arrangement of the fuselage of the "Leviathan," from which some idea may be formed of the magnitude of the machine. We would, however, advise our readers to visit the Breguet stand and there inspect the model of the machine, as this will give a much better representation than can a small diagram. Behind the engine room, it will be seen, is a large passenger cabin with

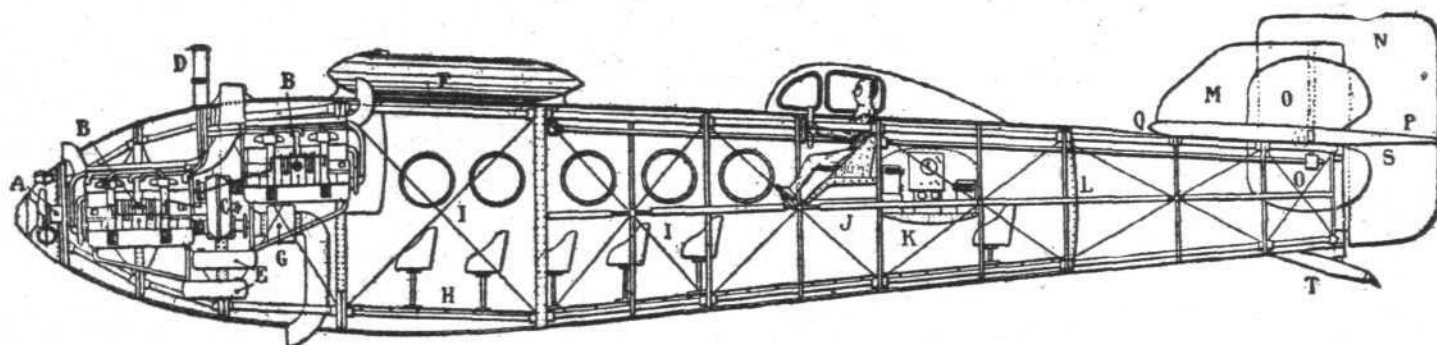


DIAGRAM OF THE BREGUET "LEVIATHAN": A, propeller shaft; B, engines; C, clutch; D, radiator; E, oil tank; F, petrol tank; G, turbo-compressor; H, attachment of lower plane; I, passengers' cabin; J, pilot's cockpit; K, wireless cabin; L, water-tight bulkhead; M, adjustable fin; N, fixed fin; O, fixed fins some distance out from centre line; P, rudder; Q, adjustable tail plane; S, elevator; T, tail skid

been made use of to accommodate the propeller shaft, which runs between the two banks of cylinders. A series of automatic clutches ensure that in case of a breakdown the faulty engine is automatically thrown out of gear, and the only consequence, as far as flying the aeroplane is concerned, is the loss of one-fourth the power until the engine can be repaired. In the "Leviathan" provision has been made for doing repairs during the journey, as the engine-house is of ample proportions, allowing a mechanic to get at either engine and clean sparking plugs, adjust tappet rods, or effect any other minor repairs or adjustments that may be required. It is therefore claimed that the "Leviathan" will be the equal of the airship in reliability, since it will fly comfortably with three engines running, and will only need to lose a comparatively small amount of altitude with only

seating accommodation for about twenty passengers. Behind and slightly above, the cabin is the pilot's cockpit, over which is a small streamline housing with windows. Behind the pilot and under the same roof, so to speak, is the wireless cabin, for of course the "Leviathan" will be provided with this modern adjunct to air travel.

From a constructional point of view the "Leviathan" is of interest as being of the all-metal type. The weight of the machine empty is to be 5,500 lbs., and when full load is carried the weight will be in the neighbourhood of 5 tons. The load can, of course, be made up of a large quantity of fuel and a crew of three only, or of a smaller amount of fuel and a larger number of passengers, according to the purpose for which the machine is to be used. The span is 85 ft. 9 in., and the wing area is 1,500 sq. ft.

THE AIR MINISTRY SECTION

THE Air Ministry exhibit in the gallery at Olympia has been specially arranged at the request of the Joint Exhibition Committee in order that the public may realise that side of aeronautical organisation and development which is undertaken by the State as co-partners with the manufacturing and transport sides of the industry.

The exhibit, organised by the Controller-General of Civil Aviation (Controller of Information), is divided into six main sections:—

- Aeronautical Inspection, Research, and Supply, Communications (Signals, Navigation and Wireless).
- Meteorology.
- National Physical Laboratory, Medical, and Airships.

The recruiting and training branches of the R.A.F. will also be represented.

In the Communications exhibit, a complete model air route of the London-Paris Air Mail route will be shown. There is also a model of the London Terminal Aerodrome at Croydon, illustrating the general "lay out" and the various buildings and offices of a modern air station.

Signalling appliances, navigation instruments and landing lights, etc., maps and air charts, clothing, devices used for medical tests of pilots and sections arranged by the Airship branch, the National Physical Laboratory and the Meteorological Section go to make up one of the most interesting exhibits ever got together.

CIVIL AVIATION—OCTOBER, 1919, TO MARCH, 1920

THE half-yearly report of the Controller-General of Civil Aviation for the period October 1, 1919, to March 31, 1920, which has just been issued, is in a different form to the first report, which was issued in two separate parts, one dealing with work in the U.K. and the other covering civil aviation in foreign countries. The present report covers both fields, so that comparison may more easily be made between the developments which are taking place here and abroad.

Although the general structure of the previous synopses has been retained, certain modifications have been adopted in order to include, in addition to an outline of the work of the Department of Civil Aviation, information on the air services to the Continent and the important developments which are taking place in India and the Dominions. In these directions considerable results have been achieved, and it is hoped that, now the preliminary stages of organisation at home and in other parts of the Empire have been accomplished, next year will see an extension of commercial enterprise and the development of Imperial air policy.

The report then goes on to summarise the changes in regulations governing civil aviation at home and the developments which have taken place. Incidentally it is indicated that a scheme has been drawn up for the utilisation of certain stretches of the Thames in the London area as alighting

places for seaplanes. Considerable developments in connection with the use of wireless are indicated.

Statistical tables are appended showing, for various periods, the work carried out by civil aircraft, the number of British and foreign machines departing to and arriving from the Continent, the value of the goods imported and exported by air, and the number of accidents sustained by machines and personnel.

It will be seen that the average length of flights has increased from slightly over 12 minutes in the first five months of civil aviation, i.e., from May to September, 1919, to 28 minutes during the six months under review, showing that the increase is mainly in real commercial traffic rather than in the instructional and propaganda work so largely carried on during the summer. This is also borne out by the fact that although the number of machine flights made and the number of hours flown during the summer months was greatly in excess of those between October 1 and March 31, the weight of goods carried in the second period considerably increased.

From August 26, 1919, to March 31, 1920, goods to the value of £209,358 were carried by the Continental Services, £136,116 representing Imports, and £73,242 Exports. Of this, £7,644 represented dutiable goods. Clothing of various

British Civil Aviation, including Continental Traffic.† May 1, 1919, to March 31, 1920.

	May to Sept. 5 months	Oct. to Dec. 3 months	Jan.	Feb.	March	Jan. to March. 3 months	Oct. to March. 6 months	May to March. 11 months
Number of machine flights made ..	31,250	4,170	542	637	1,222	2,401	6,571	37,821
Number of machine hours flown ..	6,566	1,852	309	333	567	1,209	3,061	9,627
Average duration of each flight in minutes ..	12	26	34	31	28	30	28	15
Approximate machine mileage ..	460,285	137,964	21,671	26,400	45,539	93,610	231,574	691,859
Number of passengers carried ..	58,132	6,284	793	931	1,800	3,524	9,808	67,940
Approximate number of hours flown by passengers ..	13,803	2,697	318	466	812	1,596	4,293	18,096
Weight of goods carried in lbs. ..	45,130	22,013	2,644	7,935	25,056	35,635	57,648	102,778

Departure and Arrival of Aircraft to and from the Continent.

	Aug.† 26-31		Sept.		Oct.		Nov.		Dec.		Jan.		Feb.		Mar.		Total	
	Dep.	Arr.	Dep.	Arr.	Dep.	Arr.	Dep.	Arr.	Dep.	Arr.	Dep.	Arr.	Dep.	Arr.	Dep.	Arr.	Dep.	Arr.
British ..	9	8	68	64	84	89	54	39	33	28	44	33	44	38	65	63	401	353
French ..	—	—	6	7	15	15	8	10	2	1	4	4	7	6	24	24	66	67
Belgian ..	—	—	—	—	—	—	—	—	—	—	—	—	2	3	1	1	3	4
Swiss ..	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	1	1	1
Other States ..	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total ..	9	8	74	71	99	95	62	49	35	29	48	37	53	47	91	89	471	425
Total for August and Sept.	83		79		Total for 3 months Oct.-Dec., 1919				196	173	Total for 3 months Jan.-March, 1920				192	173		

† These figures, which have been supplied voluntarily by the firms concerned, do not include competition flights from England to Australia or Cairo to the Cape.

‡ August 26, 1919, was the date upon which international civil flying first began.

Value of Goods Imported and Exported into and from the United Kingdom.

Period	Imports (Free) from—			Imports (Dutiable) from—				Re-exports to France	British Exports to—			
	Nether-lands	Belgium	France	Nether-lands	Belgium	France	Italy		Nether-lands	Belgium	France	Italy
Aug., 1919 ..	£ —	£ —	£ —	£ —	£ —	£ 1	£ —	£ —	£ —	£ —	£ 12	£ —
Sept., 1919 ..	—	—	4,425	—	—	75	—	844	—	—	2,146	—
Oct., 1919 ..	—	22	23,389	—	—	509	6	1,201	—	—	7,270	1
Nov., 1919 ..	—	9	18,009	1	—	2,132	—	584	—	7,376	6,555	—
Dec., 1919 ..	—	145	10,398	—	2	716	—	615	—	2,206	2,287	—
Jan., 1920 ..	—	—	8,188	—	—	1,687	—	1,309	—	—	1,327	—
Feb., 1920 ..	—	—	17,721	—	5	1,101	—	8,651	—	1	5,126	—
Mar., 1920 ..	470	208	45,488	—	—	1,409	—	12,528	3,497	—	6,706*	—
	470	384	127,618	1	7	7,630	6	25,732	3,497	9,583	31,429	1
	128,472			7,644				70,242				

* In addition, diamonds to the value of £3,000 were exported to France in March.

Accidents.

	May to Sept. 1919. 5 months	Oct. to Dec. 1919. 3 months	Jan. to Mar. 1920. 3 months	Oct. 1919 to Mar. 1920. 6 months	May 1919 to Mar. 1920. 11 months
Number of accidents resulting in death to one or more occupants of machine	2	2	—	2	4
Number of non-fatal accidents resulting in injury to occupants of machine	8	—	3	3	11
Number of accidents resulting in death of third party (occupants of machine uninjured)	1	—	—	—	1
Number of accidents in which no one was killed or injured ..	2	3	3	6	8
Total accidents reported	13	5	6	11	24
Approximate number of machine miles flown per accident ..	35,406	27,593	15,601	21,052	28,827
Approximate number of machine flights per accident ..	2,404	834	400	597	1,576
Approximate number of machine hours flown per accident ..	505	370	201	278	401
Pilots killed	2	2	—	2	4
Pilots injured	6	—	3	3	9
Passengers killed	—	1	—	1	1
Passengers injured	10	—	2	2	12
Third party killed	1	—	—	—	1
Pilots killed per 1,000 flights made by pilots	·06	·48	—	·30	·106
Pilots injured per 1,000 flights made by pilots	·19	—	1·23	·45	·238
Pilots killed per 1,000 hours flown by pilots	·31	1·08	—	·65	·415
Pilots injured per 1,000 hours flown by pilots	·92	—	2·48	·98	·934
Passengers killed per 1,000 passengers carried	—	·16	—	·10	·015
Passengers injured per 1,000 passengers carried	·17	—	·57	·20	·176
Passengers killed per 1,000 hours flown by passengers ..	—	·37	—	·23	·055
Passengers injured per 1,000 hours flown by passengers ..	·72	—	1·25	·46	·663

The above figures do not include competitive from England to Australia or Cairo to the Cape.

descriptions formed the principal item in both Imports and Exports. Imports also included watches and cinematograph films; Exports: precious metals, cinematograph films, drugs and perfumery.

As was pointed out in the last Report, licences are required by all pilots of aircraft, while every civil machine has to be registered and numbered, and, if carrying passengers for hire or reward, must be certified as "airworthy."

During the last six months the following licences and certificates have been granted:—

	Total issued since May 1st, 1919.
Licences for pilots	163 484
" " " renewals	129 129
" " " ground engineers	113 345
" " " engineers	1 1
" " " navigators	3 4
" " " aerodromes	36 119
" " " renewals	12 12
Certificates of registration	127 474
" " " airworthiness	107 325

The effect of the winter months is noticeable in these figures, though they show a definite, if small, development.

In Part II, which, as we have said, deals with the developments in foreign countries, the Controller-General, in General Remarks, points out that the main difficulty which has stood in the way of the still wider adoption of the International Air Convention (which has now been signed by all the Allied and Associated Powers) is contained in Article 5, which forbids the passage of aircraft belonging to non-contracting States over the territory of contracting States, and although this clause does not actually come into effect until ratifications of the Air Convention between two of the contracting States have been exchanged, neutral States have naturally hesitated to subscribe to a Convention which would effectually cut them off from Germany and other late enemy States with which throughout the war they enjoyed freedom of communication.

To meet this difficulty a Protocol has been drawn up whereby States desirous of joining the Air Convention will be able to derogate with regard to conditions laid down in Article 5, and thus, while subscribing to the Air Convention, be able to maintain communication by air with late enemy countries until such time as the latter are allowed to become members of the League of Nations.

While Great Britain is the only country which possesses an Air Ministry comprising both service and civil departments, other States, notably France, Italy, Belgium, Spain and Switzerland, have created departments for civil aviation, which, except in the case of Belgium, have been dissociated from the Ministries of War and placed under the control of

the Ministries of Public Works, Transport or Posts and Railways. Other countries, such as the Scandinavian States, have appointed special committees for considering the future administration of civil aviation.

Provisional regulations governing air navigation have been drawn up and published by France, Italy, Belgium, Spain and Switzerland. Subsidies, long distance demonstration flights, and foreign missions are among the methods used by various States to encourage civil aviation and to secure public confidence in its future.

The development of civil aviation in late enemy countries has been retarded by disturbed political conditions, the financial and economic situation, and the operation of the Peace Treaties. By the terms of these treaties the manufacture and importation of aircraft and aircraft engines and accessories is forbidden in late enemy territory for a period of six months after the ratification of peace, while all military and naval aeronautical material must be delivered up to the Allies.

Nevertheless, Germany, Austria and Hungary have created or are organising departments to deal with civil aviation—Germany possessing a Ministry of Air and Transport—while Germany and Austria have issued regulations governing air traffic.

During the last six months the British aircraft industry has continued to make headway in foreign markets. South America has been a scene of development, and it is not unnatural that attention should have turned to this part of the globe, where the great distances between commercial centres, and bad communication by road and rail, render conditions particularly well suited for the establishment of air transport.

China, Holland, Norway and Poland have also been chosen as favourable fields for exploitation, and the activity of British firms in Spain has continued.

In conclusion, General Sykes, the Controller-General of Civil Aviation, says the discovery of a new method of increasing the speed of intercommunication has in the past generally indicated a fresh step in the march of civilisation. In aviation a means of transport has been obtained twice as fast as any other previously existing. The majority of countries which are imbued with the spirit of progress appear to realise that the future of aviation cannot be neglected, and by various methods, such as the creation of aviation departments, research, subsidies, and the conduct of experimental services, are striving to adapt aviation to commerce.

In many respects the British Empire is in an unique position. Imperial solidarity can be strengthened by a system of intercommunication by air, and protection is as essential to national security from the air as from the sea. Strong air forces can be guaranteed in time of emergency by a reserve of competent airmen and reliable machines such as the expansion of

commercial aviation will ensure. In this expansion the long distances and the undeveloped character of many parts of the Empire are favourable factors.

During the experimental period, however, through which civil aviation is passing some form of State assistance is essential. In the last half-yearly report three methods were suggested—direct Government subsidies; assistance in the form of grants to approved companies according to mileage and weight carried; the provision of key aerodromes and shed accommodation at home and on the Imperial air routes. Up to the present time the Department of Civil Aviation has only been in the position to act in accordance with the spirit of the last of these suggestions and has been compelled to confine its activity to continuing the work of improving ground organisation. In the present report it has been seen that the work accomplished by the Department includes the

planning of air routes, the equipment of aerodromes, the provision of customs facilities for international flying, the improvement of wireless and other means of communication, and the introduction into Parliament of a Bill to meet the requirements of the International Air Convention. In addition, the Department is responsible for the meteorological service of the country in all its branches. By these methods private enterprise has been assisted in organising air services to the Continent which, even in the winter months under review, have been conducted with considerable regularity. Though the distances between London and Paris, and London and Brussels, are not of sufficient length to demonstrate the full value of aircraft in time-saving, yet much experience has been gained and the first step taken in the establishment of a system linking up the United Kingdom with the commercial centres of the Continent.

ROYAL AERONAUTICAL SOCIETY NOTICES



Olympia Aero Show.—Arrangements have been made for a reception-room for the use of Members to be available during the Aero Show, which is to be held at Olympia from July 9 to 20. Stand numbers 94 and 95 have been allotted for this purpose by the Exhibition Committee, and will be found immediately on the left of the Hammersmith Road entrance. A telephone which may be used free by Members will be installed (No.: Hammersmith 2130).

The room will be fitted up as a sitting-room, and current numbers of aeronautical papers will be transferred from the Library at 7, Albemarle Street.

Naval Architecture in Aeronautics.—The July issue of the *Aeronautical*, which is on sale to non-Members, price 3s. 6d., contains Commander Hunsaker's paper on "Naval Architecture in Aeronautics," including five appendices which were not read at the meeting. These appendices, which will not be published elsewhere, contain a large amount of information which has been specially released by the United States Navy Department, including details of the construction of the N.C. type Transatlantic flying boats, which have never before been published.

Wilbur Wright Lecture.—Through inadvertence the name of Major F. R. Bramwell was omitted from the list of Members

of Council present at the Dinner before the Wilbur Wright Lecture.

Lectures at Olympia.—At the request of the Air Ministry a series of popular lectures has been arranged in the Concert Hall at Olympia, at 3 p.m., on various afternoons during the Show.

The following is a preliminary list of these lectures, details of which will be announced from day to day during the Show:

- "How Airmen Find their Way," Major H. N. Wimperis.
- "Airships of the Future," Sqdr. Ldr. Pritchard.
- "Kite Balloons," Mr. Griffith Brewer.
- "Flying Boats," Capt. D. Nicolson.
- "Trans-Continental Flying," Capt. P. D. Acland.
- "Development and Future Possibilities of Aeroplanes," Mr. F. H. Green.

Air Ministry Library.—Permission has been obtained from the Air Council for technical Members of the Society to use the Air Ministry Library for reference purposes on production of letters of introduction signed by the Secretary of the Society. Any Members desiring to avail themselves of this privilege should therefore apply to the Secretary for a formal letter of introduction.

W. LOCKWOOD MARSH,
Secretary

7, Albemarle Street, W. 1.

The League of Nations and the Air

It is announced that the following air representatives on the Permanent Armaments Commission of the League of Nations have been appointed:—Great Britain, Group Capt. P. R. C. Groves; France, Brig.-Gen. Dumesnil; Japan (temp.), Maj.-Gen. H. Watanabe; Belgium, Col. A. E. M. Van Crombrughe; Greece, Capt. Panas.

No Cockades on Civil Aircraft

THE French authorities have issued a warning to civil Aviation concerns that the tricolour cockade must not be carried on commercial aircraft. Any machine so marked must have such markings removed by August 1.

Naval Officers for the R.A.F.

APPLICATIONS are invited by the Admiralty from officers who have completed their examinations for lieutenant, and have been granted watch-keeping certificates, to be seconded to the Royal Air Force for a period of three years, the majority of this period to be spent upon naval air work and with the Navy. In the event of a naval officer so loaned desiring to obtain a permanent commission in the R.A.F., the Air Council will, if they consider him suitable, make proposals to the Admiralty to this effect as such cases arise.

The Machine Tool and Engineering Exhibition

It is announced that there will be over 1,000 machines in operation at the Machine Tool and Engineering Exhibition to be held at Olympia from September 4 to September 25 next. It was to have been held in 1916, but had to be postponed on account of the War. The first Exhibition was held in 1912, and the fact that eight years have elapsed since the last exhibition of machine tools in this country will mean that more new models and new types will be on view than have ever been shown at any previous exhibition. The whole of Olympia has been booked up for some months past, and the number of separate exhibitors will exceed 200.

Air Mails in France

It is announced from Paris that a new air service for passengers, mails, and merchandise commenced operations on July 1 between Paris, Dijon, and Bourg.

Paris-Brussels and Paris-Geneva

JULY 1st saw the commencement of a new service—which, it is hoped, will soon be a daily one—from Paris to Geneva, and the restarting of the Paris-Brussels service which has been suspended for some months. The Geneva machine started from Le Bourget at 9.15, the pilot being Durafour, while the machine for Brussels—a Farman Goliath, left at 3.30 p.m., piloted by Tor.

Long-Distance Flights from Paris

WITH the object of flying to Rome and back within 24 hours, Maneyrol left Villacoublay on a Morane-Saulnier machine on June 29. Starting at 4.6 a.m., he reached Turin at 7.56 a.m., and was at Rome at 10.15 a.m. He set out on the return journey at 1.25 p.m., but encountered severe weather, and after struggling on to Turin, had to give up the idea of getting back to Paris that day.

Fronval, who started from Villacoublay at the same time to fly to Madrid and back, made the outward journey under difficulties, being impeded by clouds and mist, but landed safely at the Getase aerodrome, outside the Spanish capital. On the return journey, however, a storm caused him to land at Burgos, and he was unable to reach Paris before midday on June 30.

Air Mail to Denmark?

MAJOR SCOTT PAINE and Colonel Raikes, on their way from Christiania, have been visiting Copenhagen, and opened negotiations with the Danish officials for the establishment of an air mail route between Denmark and England. It is expected that, if satisfactory arrangements can be made, similar mail routes between other Scandinavian countries and England will be started.

AIRISTS FROM THE FOUR WINDS

At the Aero Show, Olympia, July 9-20.—FLIGHT stand, No. 41; FLIGHT telephone number, Hammersmith 2110.

THE monument to Wilbur Wright at Le Mans, France, is now completed and will be dedicated to this great aviation pioneer on July 17.

LORD LONDONDERRY will open the Aero Exhibition at Olympia tomorrow (Friday) at 12 noon.

MONDAY next, July 12, most of the survivors of the first hundred British pilots and pioneers of aviation will foregather at the Connaught Rooms for dinner. As already announced, Wing-Com. H.R.H. the Duke of York will attend the banquet, the arrangements being in the hands of a Committee of Hosts comprising General Seely (chairman), Lord Desborough, Lord Montagu of Beaulieu, Sir Robert Hadfield, Sir Charles Wakefield, Sir Samuel Waring, Sir Herbert Austin, Lieut-Col. Alan Burgoyne and Mr. Ernest J. P. Benn. It should be an historical re-union.

In the Commons on Monday the following figures of weight of mails between England and France were given:—"The average daily weight of letters and postcards sent by the ordinary mail from this country to Paris and places in France beyond Paris is 1,700 lb., including about 850 lb. for Paris itself. Precise figures of the number of articles are not available, but they are estimated at from 50,000 to 55,000 a day. The number of letter packets sent every week-day by the Air Mail to Paris averages about 85, and the total weight is from 5 lb. to 6 lb."

WHAT a commentary upon the encouragement (?) by our authorities is the last paragraph. And what a source to draw upon for first class air-mail matter is indicated in the rest of the figures, thereby for ever giving the talk of subsidy its quietus, at the same time enabling the building up of the nucleus of an unassailable reserve in men and machines against any emergency.

YET another "mysterious" fire at Cranwell, Lincolnshire, on July 2nd, resulting in about £2,000 damage, followed by a Court of Inquiry on Saturday, still leaving the "mystery" unsolved. What is wanted is some smart detectives on the job to catch the lunatic—or is it lunatics—before the whole camp and contents are burnt out. But perhaps the police are too busily occupied elsewhere seeing motorists do not travel beyond 20 miles an hour on straight roads!

CANADA evidently intends perpetuating her magnificent air reputation gained in the War. From Montreal it is announced that the province of Quebec is to organise an Air Force of 5,000, all ranks, mostly ex-soldiers. The Lieut.-Governor, Sir Charles Fitzpatrick, has been elected hon. president, and Col. J. A. Scott (Quebec) hon. chairman. It is expected that Capt. Mostyn Lewis, of Montreal, will accept the post of permanent secretary.

By sending a £40,000 diamond ring to London per the Aircor air route, a careful Parisian jeweller reduced his risks against the ever alert railway thieves for this type of booty. Incidentally it might be noted the French luxury export tax duty payable upon a gem of this calibre is about £3,600! Wonder whether that little dot was handed over to the authorities. It would take a particularly over-scrupulous owner to resist slipping that ring on to his finger, and travelling as its special wearer, thereby, presumably, dodging "customs" by reason of its being part of his ordinary "apparel." We wonder!

A SIGNIFICANT item of news is sent by the *Daily Telegraph* Malta correspondent, in connection with the war activities at present in operation against the rebellious Turks. A

British vessel, which was patrolling the Anatolian coast in charge of the Greeks, saw an aeroplane crash on the mountains and, supposing it to be British, wirelessly to the British authorities. But there were no British aeroplanes in that locality. A landing party found the crashed plane to be a German machine, with wireless telephone, machine-guns, and bombs, all of the latest type. Later, they discovered some thirty German aeroplanes in course of construction, and two ready for flight. All of these were being erected by Turkish Nationalists. What the fate of these German aeroplanes was has not transpired.

In the same message the correspondent states that the self-sacrifice and the danger incurred by the British in rescue work in the Black Sea is not sufficiently known and appreciated. The seaplane carrier "Ark Royal" did two trips, with some 800 refugees on board, who embarked in an incredibly filthy state. They were clothed in rags which had not been off their bodies for weeks. There were over 100 cases of gangrened wounds, the stench from which was awful. The ship's surgeon was busy all day on deck amputating limbs. Our men moved freely amongst these people, trying to alleviate their sufferings. They learned that these refugees had lain three weeks in a typhus hospital. Later, typhus broke out amongst the ship's company.

It was Miss Sylvia Boyden's thirteenth parachute descent from an aeroplane at the R.A.F. Pageant on Saturday. She is evidently not superstitious, or, like missing the reputed fatal number in streets, she would have skipped it and gone straight on to her fourteenth jump. Quite so, we are prepared to allot a medal to the solver of the problem.

In Madrid an original bull-fight is reported as having taken place on July 1 at the Vista Alegre Plaza in aid of a fund for the widow of Captain Collier, the English airman who was killed in an accident at Saragossa in April. The "swords" in this fight were four airmen, a Spaniard, a Frenchman, an Italian, and an Englishman.

THE bulls were small and young, but game. The inexperience of the toreadors resulted in the agony of the animals being unduly prolonged, except in the case of a bull killed by Captain Truelove, the British airman, who dispatched his adversary with one stroke. The enthusiastic spectators demanded that the bull's tail and ears be given to him, but, as tastes differ, he threw these blood-stained trophies to the crowd, somewhat to its astonishment.

RATHER a tall story comes from a Berlin correspondent who sets out that the Germans, being afraid of the Poles holding up by sabotage the trains conveying voters to the East Prussian plebiscite, got leave to carry 3,000 by aeroplane. The *Vossische Zeitung* reports that the Poles have been systematically firing on these planes, setting two on fire, with the result that one pilot has been killed. This paper alleges that the Poles are sending back all voters whose permits are not stamped; that half of the issuing officials are Germans and the other half Poles, and that the latter are intentionally omitting the stamp.

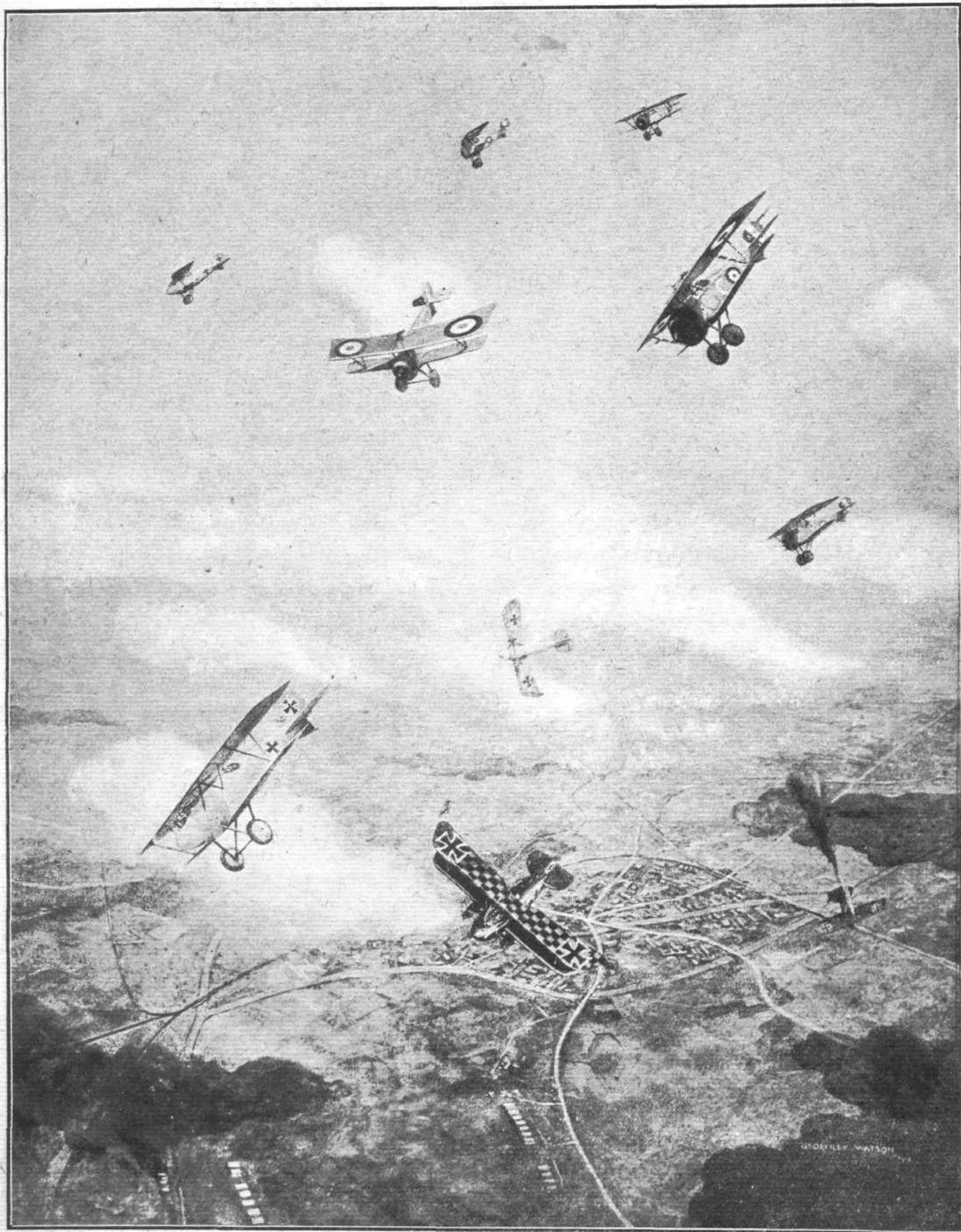
There must evidently be more aircraft in being in Germany than some of our official reports would have us believe.

THEY are looking ahead, aeronautically, in Scandinavian circles. Representatives of the Stockholm and Gothenburg aeronautical societies and the directors of the Gothenburg Memorial Exhibition have decided to arrange an International Aviation and Flying Exhibition at Gothenburg in 1923.

It would be in the Land of the Free that the first aerial funeral should be recorded. This is reported as having taken place on June 29, when a clergyman, seated in a seaplane, piloted by Lieut. A. Frank Mallen, of the United States

Marine Corps, scattered upon the statue of Liberty in the bay, as he recited the Burial Service, the ashes of Mrs. Sarah D. Brown, the well-known temperance advocate and writer of stories for children. He then dropped nine white roses—one for each decade of Mrs. Brown's life—and two pink ones

for the two years she had lived above ninety. Mrs. Brown's son and daughter, it is stated, watched from *terra firma* the ceremony, which was carried out in accordance with a request made in a letter the authoress left to be opened on the day of her death.



A SCRAP OVER DOUAI: Colonel W. A. Bishop, V.C., D.S.O., M.C., is flying C. 6 with streamer. One of the actual war incidents depicted at Mr. Geoffrey Watson's Exhibition in aid of the R.A.F. Memorial Fund, at the Brook Street Art Gallery, 14, Brook Street, New Bond Street

THERE must be a lot of wool-drawing over eyes in regard to what Germany is or is not up to in the re-building of her aircraft industry. First, it is stated that she is building thousands of machines of very much advanced designs, and the next day her whole aircraft construction organisation has gone phut. Probably a happy medium is about the correct state of the case at the moment. But quite a new outlook is now opened up in a report from Berlin to the effect that totalisator betting on aeroplane races is about to be organised at Germany's biggest aerodrome at Johannisthal, near Berlin.

This certainly does not encourage the view that the Germans are aerially played out, in spite of the totalisator move being attributed to a stunt for raising capital to rehabilitate German aeroplane firms. But it gives one to think furiously as to the determination of the nation to look forward to the next Tag—in the Air.

THOSE Wazirs have recently been studying the art of dentistry with a couple of British pilots as "subjects." According to the *Daily Mail* Bombay correspondent, two British airmen recently fell into the hands of the Wazirs on the North-West Frontier of India through an accident to their machine, and have been ransomed by the Government after an exciting time in the tribesmen's hands.

As soon as they caught them, the Wazirs, the correspondent relates, took the gold-filling from the teeth of one of their prisoners, and, according to the tribesmen, it was unheard of for prisoners to retain any wearing apparel. The two airmen were therefore stripped. There was also talk of

converting them into mincemeat. A council was held by the tribal greybeards, who suggested that the prisoners be held to ransom. The suggestion was adopted, and a message was despatched to the British lines, stating that two Britishers had fallen into their hands, but their release could be effected by the payment of a ransom, which, according to the prisoners themselves, was out of all proportion to their worth. The gold-filling may have had something to do with it. At any rate, the two airmen, one an Irishman, the other a Canadian, breathed freely again.

THEY were kept in a dirty *chawl* or reed hut, so the story continues, where nuts were thrown to them to eat, and occasionally a dish of maize and sour butter milk was placed before them. Children came to gaze at them open-eyed, while their elders at the conference, which had not yet terminated, brandished knives in the air. Once an old hag appeared in the doorway waving a weapon which looked like a sickle, and from her antics it was gathered that she would like to carve the captives up. Eventually, the two airmen were awakened one morning and told to get ready to return to the British lines. The old hag, already referred to, came to say good-bye, and gave the Canadian officer a piece of butter to rub on his knee, which had been injured in the aeroplane crash. Escorted by 400 armed Wazirs, the prisoners were taken to Bannu and handed over to the British political agent.

WHAT strange things do happen to Irishmen and Canadians, to be sure.

THE SURRENDER OF "L 71"

ALTHOUGH it has been an open secret for some time that the Zeppelin "L 71" was expected to arrive in England at any time, there was an uncertainty right up to the moment it actually set out from Alhorn at 5 p.m. on June 30 as to when the surrender would take place. There were on board two German officers, Captain Heine and another; also three British officers—Colonel Sparling, Captain R. Booth, and Captain R. F. Durrant. Until the "L 71" was actually landed, she was in charge of the German officers and men, the crew numbering 21. The landing was directed by Captain Heine, and was successfully effected at 12.50 p.m. The great airship, after skirting Borkum and the Frisian Islands, came over the English coast north of Great Yarmouth

at 5 a.m., having encountered a 20-mile headwind when crossing the North Sea. After circling above Pulham about 6 a.m., the airship—which has been blackened over with the exception of the "1" of "L 71," headed for Norwich and cruised about in order to release a certain amount of gas. Returning to Pulham, the landing was successfully effected as mentioned above, and the landing party of 300 had the airship safely housed in the shed prepared for R 34. The chief dimensions of "L 71" are: Length, 743 ft.; lifting capacity, 73 tons; gas capacity, 2,500,000 cubic feet; speed 72 m.p.h.

The German officers and men left Pulham on Saturday for Grimsby, en route for Germany.



A FLYING BOAT IN VERY STRANGE SURROUNDINGS: A Macchi-Nieuport flying boat, of the Swiss Ad Astra-Aero Co., flying over the Alps

AIR MINISTRY NOTICES

Landing Lights at Bordeaux Aerodrome

It is hereby notified that:—

The landing lights at Bordeaux Aerodrome, as described in Notice to Airmen No. 28 of March 24, 1920, are only exhibited when aircraft are expected.

Pilots intending to land at Bordeaux at night should therefore communicate direct with the Commandant, whose telegraphic address is "Commandant, Aero Merignac, Bordeaux."

It is not necessary to advise the Commandant beforehand when landing in the day.

Attention is drawn to Notice to Airmen No. 66 of June 7, 1920, under which all aeroplanes entering France from England must first land at either St. Inglevert or Le Bourget Aerodrome.

(Notice to Airmen No. 75, cancelling Notice No. 69 of June 18.)

French Aerodromes' Signal Procedure

The following information is hereby notified:—

A.—Alteration in Night Signals

Valenciennes.—An occulting light-house giving a white light, which has been established at the N.E. angle of the ground (2 km. south of the town), is in operation every day from June 1 from one hour after sunset. The characteristic signal is —V—, three short flashes and one long flash (10 secs.). Light, 0.5 sec.; occultation, 0.5 sec. Light, 0.5 sec.; occultation, 0.5 sec. Light, 0.5 sec.; occultation, 0.5 sec. Light, 3.0 secs.; occultation, 4.0 secs.

B.—Day Signals

Le Bourget.—An arrow giving the direction for landing has been placed at the angle formed by the line of the hangars and the offices of the aerodrome. A white wind

sleeve has been placed on the second hangar to the south of the offices of the aerodrome.

St. Inglevert.—A landing arrow 10 metres long has been placed at the south angle of the ground; landing must be carried out in the direction of the arrow.

C.—Telephonic Connection

Nîmes.—The telephone number of the principal air station of Nîmes is: Nîmes 693.

Telephone priority.—The following telephone stations have priority for urgent communications with respect to the safety of air navigation:—

Stations in Connection.	Telephone Exchanges.
Abbeville (with Le Bourget via St. Inglevert)	Abbeville, Paris Nord, Calais
La Heve (meteorological) with military W/T Kleber Barracks	Le Havre
Pujaut (principal air station) with Nîmes (principal air station)	Avignon, Nîmes

D.—Radio Telephony and Radio Telegraphy

Maubeuge.—A wireless station has been in operation since May 22. It ensures temporarily a special service with a wave length of 1,200 metres, and will later be incorporated in the Paris-London system with 1,400 metres wave length. The call sign is A.V.

Warning with regard to Squalls.—Commencing from May 25, the warnings of squalls previously sent by 1,850 metre wave lengths are emitted by 1,400 metres wave lengths. The stations issuing the warnings are:—Le Bourget Z.M., Strassburg C.3., Bourges Y.E., Amiens Y.B., Tours Y.G., Toulouse Y.F.

(Notice to Airmen No. 76. Authority: French Notice to Airmen No. 8.)

Prohibited Area in Holland

It is notified that the Dutch Minister of Ways and Communications has determined that the air space above the Doorn area, where the Kaiser is interned, must be avoided by aircraft other than Netherland military aircraft. The area is delineated as follows:—Line: Driebergen Station—Culemborg railway bridge; Lek and Neder-Rijn from Culemborg railway bridge to the ferry at Amerongen. Line: Ferry at Amerongen to the crossing-point of the railway lines Rhenen—Amersfoort and Arnhem—Utrecht; railway line between the said crossing-point and Driebergen Station.

Those Mysterious Fires at Cranwell

THERE was another outbreak of fire at Cranwell (Lincs) Aerodrome on the night of July 2, resulting in damage, estimated at £2,000, to a large shed and some aeroplanes that were stored in it.

A Court of Inquiry held at the camp on the following day examined a great amount of evidence without succeeding in solving the mystery of this and the previous fire.

The shed, it was found, was safe at 4 p.m. on July 2, when the last person who had reason for being in the building left. At half-past nine the shed was observed to be on fire. The camp fire brigade soon had the outbreak in hand, the majority of the machines being removed.

An Aerial "Beanfeast"

FOR their annual outing last Saturday the employés of Messrs. Macdonald, Syer and Co., Ltd., engineers, commenced what may become a new vogue. Two aeroplanes—a Handley Page, with thirteen passengers on board, and a De H 4—conveyed a number of the party to Margate. On the homeward journey there was such a demand for seats that a ballot had to be arranged.

Peru and Commercial Aviation.

In a report just issued on the Trade and Industry of Peru at the close of the year 1919, by the Commercial Secretary of H.M. Legation, Lima, the following occurs under the heading of "Commercial Aviation":—

"Commercial aviation is not yet practised in Peru. There are at present in the country six-two seater Curtiss biplanes of the training type with dual control. There are also two machines imported by the French Military Aviation Mission, and more English flying boats are expected to arrive shortly. The Government is open to proposals for a service of mail and freight carriage, in virtue of a Bill passed by the Legislature empowering it to make such a contract. It appears useless to offer machines only, the Government apparently desiring to enter into a comprehensive contract under which it would be free from all responsibility as regards the working of the

service. There would seem to be a considerable field for the employment of aeroplanes along the barren coast of this country, where distances between the principal settlements are great and the sea voyage occupies considerable time. The prevailing winds are from the South, and flying may very possibly be interfered with by fog during four months of the year. Flying in the interior does not present good prospects on account of the different mountain ranges and the frequency of bad pockets and variable currents. The possibility of the carriage of valuable ores in the interior is being considered, but for the above reasons and the lack of good landing-places the prospects for it are not very favourable."

24-Hour Flight in the U.S.

FROM Philadelphia comes word that on June 28 Mr. J. M. Larsens, on a Junkers monoplane imported from Germany, has beaten the American non-stop record by flying from Omaha to Pine Valley, N.J., a distance of 1,000 miles, in 24 hrs. 10 mins. The confirmation of this flight will be awaited with interest.

Air Work with the Poles

A DELAYED report, dated June 30, from the Polish Army Headquarters, indicates that good work had been done by the American Aviation unit against the Budienny's dense columns of cavalry and vehicles. The aeroplanes are said to have descended to within 30 ft. from the ground and enfiladed the Bolsheviks with machine guns, after hurling bombs.

A Bayonne-Bilbao Service

ON June 26, an aerial service was started between Bayonne and Bilbao. The passengers on the first seaplane to make the trip to Bilbao were M. Flandin, the French under-Secretary of State for Aeronautics, Commandant Casse and M. Jacob.

German Machines for Turkey

"I AM informed on authority which I believe to be thoroughly sound that aeroplanes are being sent from Germany to Mustapha Kemal via Russia," states the *Daily Mail* correspondent in Paris. He adds that during the past fortnight 15 aeroplanes are stated to have thus left Germany, accompanied by German ex-flying officers receiving Turkish pay.

Germany Resuscitates Aerial Mail

THE German aeroplane postal service, after a period of suspension, is to be given a new lease of life. It was announced that a start was to be made on July 4. The first service to be between Berlin and Swinemunde.

PERSONALS.

Married.

Maj. CLAUDE GORDON BEATSON (private secretary to the Chief of the Air Staff) was married on June 30, at Christ Church, Lancaster Gate, to Miss LILIAS MARY ELLIS, daughter of the late Mr. Clement Campbell Ellis and Mrs. Ellis, of Kniveden Hall, Leek, Staffordshire.

RUPERT HART MEERS, late Capt., R.A.F., M.A., of Chiselhurst, was married on July 6 at St. George's Church, Bickley, to ALICE NORAH GUNN, daughter of the late W. Cecil Gunn, and of Mrs. Gunn, of the Red House, Bickley, Kent.

To be Married.

The engagement is announced between Capt. GILBERT BARRETT, R.A.F., Aeroplane Experimental Station, Martlesham, Suffolk, and PHYLLIS, second daughter of Sir WILLIAM and Lady CHURCHMAN, Felixstowe.

The engagement is announced between Mr. RICHARD CECIL JOYNSON-HICKS, late 1st Queen's Regt., elder son of Sir William Joynson-Hicks, Bt., M.P., and Lady JOYNSON-

HICKS, of 15, St. James's Place, and Tacolneston Hall, Norwich, and EVELYN MARY ROTHERY, only daughter of the late Mr. J. F. McNellan and the late Mrs. McNellan of Dollar, Clackmannanshire, N.B.

The marriage arranged between Air-Marshal Sir HUGH TRENCHARD and the Hon. Mrs. JAMES BOYLE, daughter of the late Edward Salvin Bowlby, will take place at St. Margaret's, Westminster, on July 17, at 2.30.

Items.

Capt. G. F. H. BLOOM, late R.A.F., has now resumed private practice at 17, Welbeck Street, Cavendish Square, W. 1.

LIEUT.-COL. CHARLES FREDERICK POLLOCK, R.A.F., of Vernon House, Bloomsbury-square, W.C., and the Isthmian Club, Piccadilly, W., who was one of the founders of, and, until his death, on the Committee of the Royal Aero Club, and who died on July 17, left property of the value of £32,885 19s. 9d. He gave £200 to his clerk, Reginald Miller, and £100 each to his clerks, B. C. Stratton and Charles Willis.

To Assist French Manufacturers in China

It is stated that French aeroplane constructors in China are to be assisted by the French Government through the intermediary of the Société Nationale Aeronautique, who will sell them material now in China which was originally intended for Russia.

A French Aerodrome Destroyed

THE French Army aviation park at Thouars, near Angers, was destroyed on the night of July 1 by fire, a number of aeroplanes, motors, and 3,200,000 metres of cloth being involved.

No one was injured. The damage is estimated at five hundred million francs, and up to the present the cause of the fire has not been ascertained.

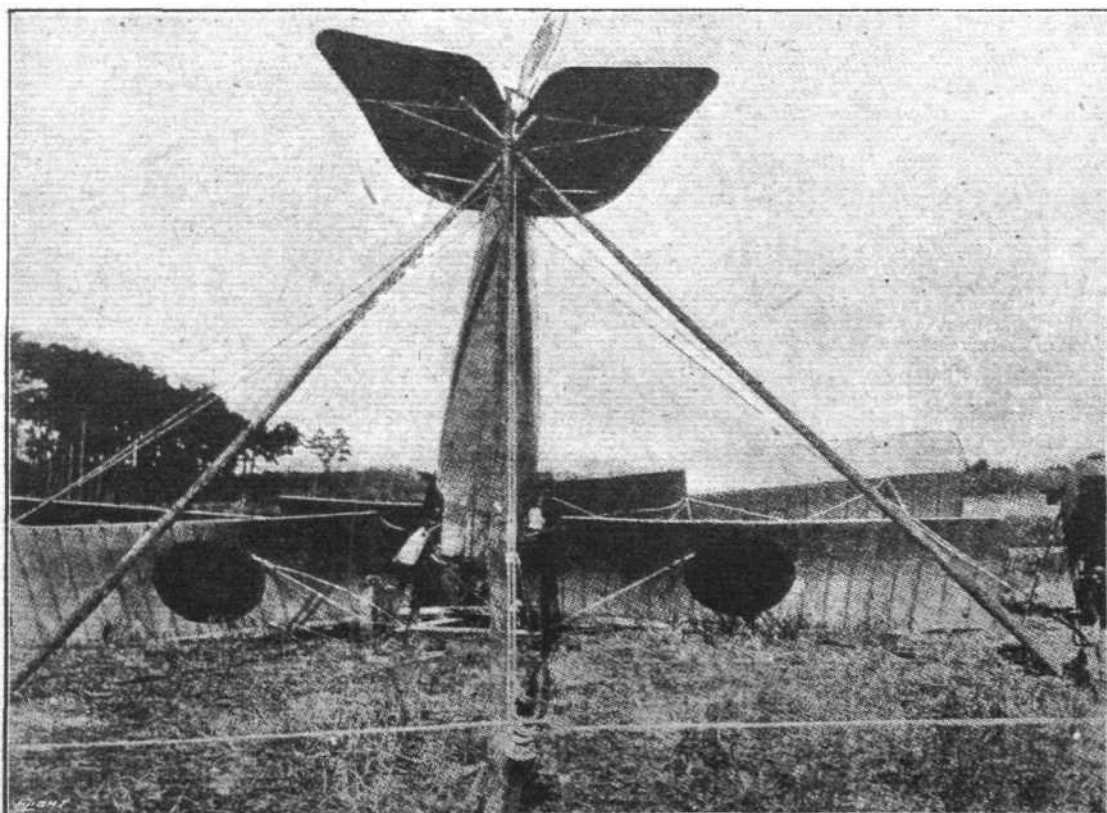
The Monument to Chavez

M. FLANDIN, the French Air Minister, has given his patronage to the Committee in charge of the Memorial to Chavez, who was killed at the conclusion of his flight over the Alps on September 23, 1910. The memorial is to be unveiled at Brigue, where the disaster occurred, on September 12, and the Peruvian Government has contributed 10,000 francs towards the cost.

Lieut. Roget's Progress

ANOTHER stage in his aerial tour of Europe was made by Lieut. Roget on June 28, when he flew from Lemburg to Bucharest. He had to negotiate several thunderstorms and took 5 hours to cover 281 miles.

He reached Constantinople on July 4.



A Japanese
Crash.— Follow-
ing its crash at
the Tokorzawa
military aero-
drome during the
War, when its
pilot, Lieut.
Sakamoto, was
killed, this bi-
plane was
propped up in the
posture in which
it struck the
ground, so that
the Japanese
military authori-
ties might study
the accident fully.

THE ROYAL AIR FORCE

London Gazette, June 29, 1920

Permanent Commissions

Flying Officer J. R. M. Simpson (A.) resigns his permanent commn.; June 30.

Short Service Commissions

Flying Officer B. C. Akehurst (T.) relinquishes his short service commn on account of ill-health, and is permitted to retain his rank; June 26.

Flying Branch

Flight Lieut. H. S. Lees-Smith relinquishes grading for pay and allowances as Squad. Leader on ceasing to be employed as Squad. Leader; Aug. 27, 1919. Flying Officer W. J. Butler, A.F.C., relinquishes acting rank of Flight Lieut. on ceasing to be employed as Flight Lieut.; April 20. Pilot Officer H. L. Marshall to be Flying Officer; Nov. 21, 1919 (since demobilised). Pilot Officers (O.) to be Observer Officers.—H. Ingram; Feb. 29 (since demobilised). C. D. Ball, M.M.; April 22.

Sec. Lieut. T. Hodgson (late General List, R.F.C., on prob.) is confirmed in rank as Sec. Lieut. (A.); Sept. 23, 1918.

(Then follow the names of 7 officers who are transfd. to the Unemployed List under various dates.)

Lieut. (actg. Capt.) W. Sharpe, A.F.C. (Lieut., General List), relinquishes his temp. R.A.F. commn. on retirement from Army, and is permitted to retain rank of Capt.; July 3. Lieut. D. G. Powell (Lieut., Brecknock Bn., S. Wales Bord.) relinquishes his R.A.F. commn., and is permitted to retain his rank; Feb. 24, 1919 (substituted for *Gazette*, April 4, 1919). Sec. Lieut. R. B. Ronald relinquishes his commn., and is permitted to retain his rank; Feb. 8, 1919.

Gazette Dec. 13, 1918, concerning T. M. Hodgson is cancelled.

Administrative Branch

Capt. H. R. Radford to be Capt., from (S.O.); April 24, 1919 (since demobilised).

Sec. Lieuts. to be Lieuts.—(Hon. Lieut.) G. T. Cain; June 21, 1918 (since reclassified Technical). H. R. Boasten; July 10, 1919 (since relinquished commn.). Pilot Officer L. P. St. V. Nepean to be Flying Officer; Nov. 3, 1919 (since demobilised).

(Then follow the names of 3 officers who are transfd. to the Unemployed List under various dates.)

Sec. Lieut. T. A. Rowland relinquishes his commn. on account of ill-health contracted on active service and is granted rank of Lieut.; June 23.

Maj. (Hon. Lieut.-Col.) C. P. Foley relinquishes his commn.; June 3, 1919. Capt. (Hon. Maj.) W. B. Armitage (Maj., Lancs. Fus.) relinquishes his R.A.F. commn., and is granted rank of Maj.; Feb. 23, 1919 (substituted for *Gazette* of Nov. 4, 1919).

Gazette of July 29, 1919, concerning Lieut. C. R. Young, is cancelled; *Gazette* of June 3, 1919, to stand.

Technical Branch

Lieut. H. R. Sterrett is graded for purposes of pay and allowances as Lieut., Grade (B.); Sept. 20, 1918.

Sec. Lieuts. to be actg. Capts. whilst employed as Capts., Grade (A.).—G. T. H. Pack; from Jan. 20, 1919, to April 30, 1919. A. E. Case; from Feb. 15, 1919, to April 30, 1919.

Flying Officer A. J. Briddon to be Flying Officer Grade (A.), from Grade (B.); Aug. 9, 1919, and is graded for purposes of pay and allowances as Flight Lieut. whilst employed as Flight Lieut., Grade (A.); Aug. 9, 1919 (substituted for notification in *Gazette* of June 15). Flying Officer L. R. Peirce is restored to the Active List; April 26. Sec. Lieut. R. M. Duke to be Lieut., Grade (A.); June 29, 1919 (since demobilised). Pilot Officer D. Morton to be Flying Officer, Grade (B.); April 25 (since demobilised).

Pilot Officers to be Flying Officers.—H. J. Adkins; Oct. 1, 1919. H. R. Powell; April 22 (since demobilised) (substituted for notification in *Gazette* of June 22). W. S. Harman; May 21. Sec. Lieut. C. E. Cullen to be Lieut., without pay and allowances of that rank; April 9, 1919. Pilot Officer J. L. Adams, M.B.E., D.S.M., to be Flying Officer without pay and allowances of that rank; Oct. 1, 1919 (since demobilised).

(Then follow the names of 2 officers who are transfd. to the Unemployed List, under various dates.)

Lieut. H. R. Powell is placed on the Retired List; May 15 (substituted for *Gazette* of May 14).

Lieut. W. H. Bowker, M.M. (Sec. Lieut., General List), relinquishes his temp. R.A.F. commn. on retirement from the Army, and is permitted to retain the rank of Lieut.; June 30.

Medical Branch

One officer transfd. to the Unemployed List.

Chaplains' Branch

(The following are granted a Short Service Commission.—Rev. C. W. Hall May 29. Rev. G. L. Robinson, D.S.O.; June 1.

Memoranda

(Then follow the names of 32 Cadets granted hon. commns. and 2 Overseas Cadets granted hon. commns. as Sec. Lieuts.)

London Gazette, July 3, 1920

Flying Branch

Squad-Leader F. E. Sandford, A.F.C. (A. and S.), is restored to the Active List; June 22.

(Then follow the names of 13 officers who are transfd. to the Unemployed List under various dates.)

Wing-Com. H. M. Meyler, D.S.O., M.C. (Capt., Bord. R.), having retired from the Army and relinquished his R.A.F. commn., is permitted to retain rank of Lieut.-Col. Lieut. (actg. Capt.) W. Sharpe, A.F.C., Lieut. (General List), relinquishes his temp. R.A.F. commn. on retirement from the Army, and is permitted to retain rank of Capt.; July 3. The following Lieuts. relinquish their commns. on account of ill-health and are permitted to retain their rank:—J. B. Hodgson (contracted on active service); June 16 (substituted for *Gazette* June 22). G. D. Falkenberg (caused by wounds); June 23. Sec. Lieut. W. J. Wickens relinquishes his commn. on account of ill-health contracted on active service, and is permitted to retain his rank; June 25. Pilot Officer E. Dionne is dismissed the Service by sentence of General Court-martial; May 18. The notification in *Gazette* Sept. 13, 1918, on page 10788 concerning P.O.O. F. Pamment should read F. T. Pamment. The notification in *Gazette* June 29 concerning Lieut. (actg. Capt.) W. Sharpe, A.F.C., is cancelled. The surname of Sec. Lieut. H. Ingram is as now described, and not Ingham, as stated in *Gazette* June 29.

Administrative Branch

Flight Lieut. A. P. M. Sanders is placed on Half-pay List, scale (B.); July 1.

Technical Branch

Seven officers are transfd. to the Unemployed List under various dates.

Medical Branch

Fleet Surg. A. W. Iredell (R.N.) is granted a temp. commn. as Lieut.-Col., Grade (A.); Oct. 1, 1918, with seny. April 1, 1918, and to receive pay and allowances as Maj., Grade (A.), for period Oct. 1, 1918, to May 15, 1919.

One officer transfd. to Unemployed List. The notification in *Gazettes* Nov. 26, 1918, Feb. 7, 1919, and June 6, 1919, concerning Maj. A. W. Iredell (Staff Surgn., R.N.) are cancelled.

Memorandum

P.F.O. H. D. Brown is granted a temp. commn. as Sec. Lieut.; Feb. 15, 1919.

(Then follow the names of 8 Cadets granted hon. commns. as Sec. Lieuts.) Sec. Lieut. O. G. Malcolm relinquishes his commn. on ceasing to be employed, and is permitted to retain his rank; March 1, 1919. Sec. Lieut. H. D. Brown relinquishes his commn., and is permitted to retain his rank; March 2, 1919.

The notification in *Gazette* June 11 concerning P.F.O. F. T. Pamment is cancelled.



IN PARLIAMENT

Aircraft Repair Depot, Yate, Gloucestershire.

MR. RENDALL, in the House of Commons, on June 21, asked the Parliamentary Secretary to the Ministry of Munitions whether the depot of the Royal Air Force at Yate, Gloucestershire, has been sold by the Disposal Board to two local firms; whether a considerable time has elapsed since this agreement was come to, but the Board has failed as yet to transfer the property; why there has been this delay; and is he aware that the serious condition of unemployment in Bristol makes the immediate transfer of the property urgent?

MR. HOPE: Arrangements have been made for the sale of two portions of the Aircraft Repair Depot at Yate, Gloucestershire, to two separate firms, and both transactions are in course of completion, which will be expedited as much as possible. In both cases some of the land had not been actually acquired by the Government, and I regret that some delay has been caused thereby.

Air Service, Kieff and Warsaw.

CAPT. W. BENN on June 23 asked the Secretary of State for Air whether there is a British air service between Kieff and Warsaw; when the first flight was made; and whether the British machines are armed?

MR. CHURCHILL: There is no British air service between Kieff and Warsaw. The second and third parts of the question, therefore, do not arise.

Surrender of German War Planes

COL. CLAUDE LOWTHER on July 1 asked the Prime Minister whether the stipulated number of war planes have been surrendered by Germany to the Allies; how many of these have been destroyed before delivery; and whether it would serve the Allied cause best if many of these war planes were to be sent to some Allied zone from which they could be used for purposes of offence against belligerents with whom we have declared war since the Armistice?

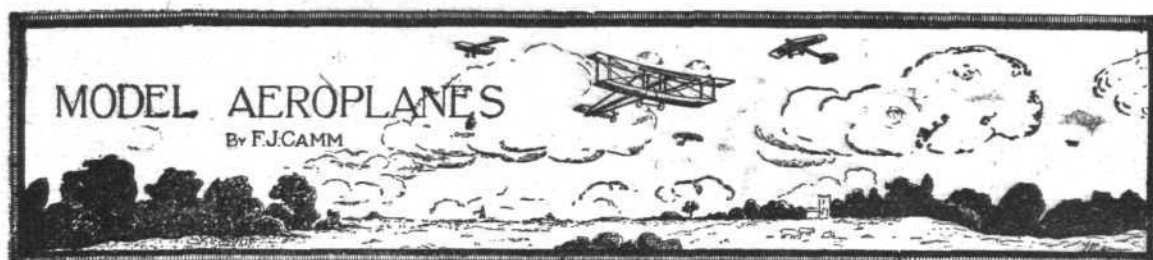
MR. BONAR LAW: In accordance with the provisions of the Peace Treaty, all aeronautical material used or designed for warlike purposes is to be surrendered to the Allies. Up to June 19, 1920, nineteen seaplanes had been handed over to the Allies and 2,846 aeroplanes had been destroyed under Allied supervision. Owing to the disadvantage of increasing the variety of types employed and the difficulty of providing for the supply of spares, I am afraid the suggestion contained in the third part of the question is not practicable.

Disabled Airmen's Pensions

AN order by H.M. the King dealing with the pensions of airmen disabled, and of the families and dependents of airmen deceased in the Great War, has just been issued by the Air Ministry. Space does not permit of the Order being given in full in these columns, but those who are interested can obtain copies from the Stationery Office, or through any bookseller, for 3d net.

Scientific and Industrial Research

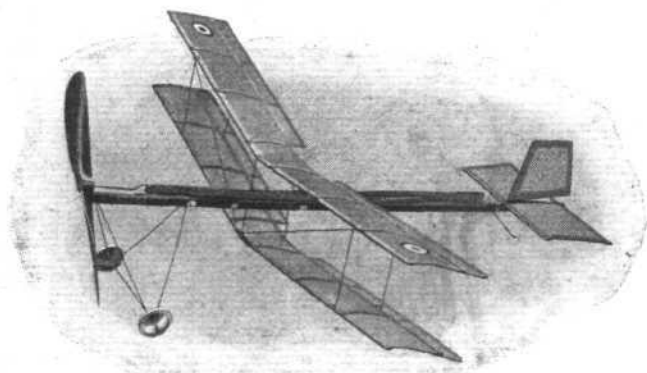
PROFESSOR SIR JOHN CADMAN, K.C.M.G., D.Sc., University of Birmingham, Mr. W. B. Hardy, Soc. R.S., Gonville and Caius College, Cambridge, and Professor Sydney Young, D.Sc., F.R.S., Trinity College, Dublin, have been appointed by an Order of Council dated June 24, 1920, to be members of the Advisory Council to the Committee of the Privy Council for Scientific and Industrial Research.



All communications to be addressed to the Model Editor. A stamp should be enclosed for a postal reply

Model Firms at the Forthcoming Olympic Aero Show.

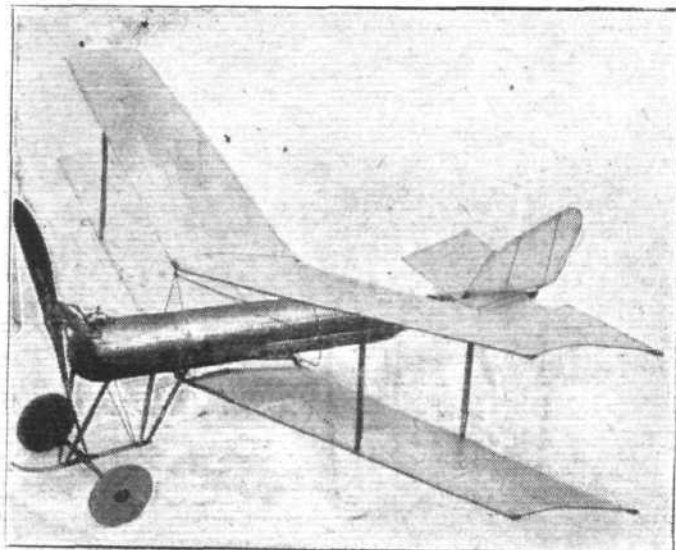
Messrs. A. E. Jones, Ltd., 52 High Street, New Oxford Street, London, W.C. 2. (STAND 21).—As is doubtless patent to all our readers, Messrs. Jones were pioneers in establishing a model aeroplane accessory business in this country. A full range of their goods will be shown (a glance at their catalogue will show this to be a comprehensive one, and anticipates the most minute requirements of the model maker), including r.o.g. machines, both tractor and canard, built-up fuselage models (a reproduction of one of which is



A popular model biplane by Messrs. A. E. Jones, Ltd.

here given), scale models, wood of all sections, wire, air-screws (both two and four bladed, in carved and bentwood), elastic, an interesting form of hollow spar with elastic enclosed, varnish, lubricant, wheels (disc and tangent spoke), gears and gear brackets, winders, soldering outfits, and a full range of text-books suitable for the beginner. One congratulates this firm on their enterprise in the world of model aeronautics, and upon the issue of such a complete catalogue which, fully indexed as it is, should prove an almost indispensable *vade mecum* to the modellist. A copy can be obtained for sixpence, which amount is allowed off the first purchase exceeding 2s. 6d.

The D.A.P. Engineering Co., 185-197, Replingham Road, Southfields, London, S.W. 18. (STAND 9).—This well-known firm, founded by Mr. D. A. Paveley in 1907, are showing



A compressed air model by Mr. D. A. Paveley

scale models of full-size aircraft, miniatures and larger sizes, reproduced in correct colours and markings, compressed air plants, compressed-air-driven models, rubber driven models,

and propellers, accessories and all materials. A visit to this stand will prove of interest and help to our readers. An illustration is given of their compressed-air-driven tractor biplane. We referred in greater detail to this firm in our issue of June 3rd.

Those Competition Cups

I SHOULD be glad if those in possession of the cups formerly belonging to the now defunct K.M.A.A. would communicate with me without delay. I have made somewhat exhaustive enquiries regarding them, but up to the present they have proved unavailing. Perhaps if this catches the eye of Mr. Akehurst, he will communicate with me. It seems extraordinary that the whereabouts of a number of valuable cups, such as the "Wakefield," "Gamage," "Model Engineer," "Johnson," etc., cannot be readily ascertained.

If there is no likelihood of a resuscitation of the K.M.A.A. a new body should be formed. Meanwhile the stimulus to model aviation which competitions for these cups would undoubtedly give is withheld, and the cup winners, if they still hold these cups, should return them to the Secretary of the R.A.C., Clifford Street, W. 1.

As a sort of anticlimax, an offer comes from a reader who is willing to help swell a fund for a cup or other trophy for power-driven machines. "I am prepared to start the subscription list with £1 1s. 0d., and others willing to add should let me know the amount they are prepared to give. It would then be possible to arrange some rules in conjunction with one or two 'power-driven' modellers for an annual competition."

Air-screws Further Considered

THE pitch of the air-screw bears a definite relation to the speed of the model; for instance, if the speed of the model is 15 m.p.h. or 22 ft. per second, it would obviously be incorrect to fit an air-screw whose pitch multiplied by its revolutions per second fell short of this distance. Now, the pitch of a screw is found by multiplying the tangent of the angle of the tip of the screw by the circumference of the disc swept by the propeller. If, therefore, the angle of the tip is 30 deg., by looking up a table of natural tangents (to be found in any good engineering pocket-book) we find that the corresponding tangent is .57 approximately. If the diameter of the air-screw is 12 ins., the circumference of the disc swept by it will be $3\frac{1}{2} \times 12 = 37\frac{1}{2} = 37.42$. Multiplying this by the tangent, .57, we obtain 22.32 ins. as the pitch of the screw. Now, the speed of the model is 22 ft. per second. Therefore, dividing this by 22.32 ins. gives the revolutions per second of the screw in order to obtain the correct flying speed, but we must first make a deduction for "slip." Slip is expressed as a percentage of the theoretical pitch, and represents the amount of the actual pitch lost due to the yielding nature of the air. For instance, an air-screw with a theoretical pitch of 24 ins. may only give an effective pitch of 18 ins., wherefore there is 6 ins. slip = $\frac{6}{24} = 25$ per cent. It is usual to make about 30 per cent. deduction for slip to be on the safe side, hence the effective pitch is 70 per cent. of 22.32 = 15.62. Now, dividing 22 ft. (= 264 ins.) by 15.62 thus, $\frac{264}{15.62} = 16.9 =$ revolutions per second at which the screw must be driven.

Thus, in order that the model may fly most efficiently, a screw with a theoretical pitch of 22.32 ins. revolving at 16.9 revolutions per second, or 101.4 revolutions per minute, must be fitted. If the slip does not amount to 30 per cent., the model may fly a trifle faster than 15 miles an hour; but it is not thought that any model air-screw has an efficiency of 70 per cent. Indeed, full-sized air-screws seldom equal this, so the speed, if anything, will be under this.

Slip can only be determined by actual trial. For example, suppose in the case we have outlined above, the screw had been wound 500 times. Theoretically, therefore, the model would fly 500×22.32 ins. = 310 yds. If the model is adjusted to fly straight, and the actual line of flight be measured, it will be found to measure something short of

this, perhaps only 201 yds., when slip will be 35 per cent. and hence the screw efficiency 65 per cent. In order to reduce slip to the lowest possible proportion, the largest permissible diameter of screws should be used with narrow blades and fine pitch—the latter should certainly not be more than one and a half times the diameter for single-screw machines, and not more than thrice the diameter for twin-screw machines. Small screws driven at high speed are efficient because of the disturbances and wasteful eddies they set up.

An air-screw can be likened to a bolt revolving on a nut, but there is this important difference. One turn of a bolt in a nut with, say, 14 threads per in., is bound to advance one pitch = $\frac{1}{14}$ of an in.; but an air-screw, owing to the yielding nature of the medium in which it operates, cannot possibly advance one complete pitch per revolution owing, as we have seen, to the existence of slip. If, however, the analogy of the bolt and nut is kept in mind, it will help the reader to understand the fundamental principles of the air-screw. In a subsequent article I shall deal with the construction of carved screws.

The principle of air-screws (working in air) is precisely the same as that of screws of ships working in water, the only difference being in the density of the media, water being some 800 times denser than air. From the reaction of the blades on both fluids we derive thrust, and in both we also have the retrograde action known as "slip." This amount of retrograde action is equal to the loss in the forward movement of the screw. The amount of slip depends upon two things; the density of the fluid in which it is working, and the amount of drag or resistance to its travel placed upon it by the object which it is required to move, *i.e.*, the planes, fuselage, etc., of the machine. The slip is referred to in terms of percentage of theoretical pitch; that is to say, the actual pitch whilst the theoretical pitch less the slip is the effective pitch.

SIDEWINDS

THE reliability of the C.A.V. magnetos was again demonstrated during the important motor-cycling events which took place in the Isle of Man recently. A Norton secured second place in the classic senior race, with seven others in close formation behind; whilst in the Flying Kilometre for machines entered in the big race Nortons again scored, being first and third in the class, and second in the open event, a Singer, C.A.V. equipped, being third. Messrs. C. A. Vandervell have every reason to be proud of these results, in the most strenuous motor-cycling competitions of the year.

THE aerial passengers' equipment department at the Cricklewood Aerodrome report the interesting fact that, as the passenger traffic expands, so does the bulk of the individual passenger increase. There was a time when the average passenger answered to the description of light and graceful, with a fighting weight not exceeding nine stone, whose elegant form presented no difficulty to the official charged with the duty of fitting on the aviation coat *à la rigueur*. The expansion has been gradual, but the difficulty of buttoning up a portly figure of an aerial passenger weighing fifteen stone or thereabouts has already occurred. The aerial equipment department is now contemplating the desirability of ordering some outside sizes of aviation costumes.

THE Instone Air Line announce that owing to the confidence they have in their pilots and aeroplanes they are quoting new rates which include free insurance to passengers up to £1,000 against death and accidents. The Instone Air Line's new fares from London to Paris are £10 10s. single and £18 18s. return; double ticket (two persons), single, £18 18s.; return £35 10s.

THERE is pleasing evidence that supplies of Cellon are still needed overseas, and Messrs. Cellon, Ltd., now find it necessary to commence manufacturing their materials in Spain.

To Our Readers

As we continually receive complaints from readers that they experience difficulty in obtaining their copy of FLIGHT promptly each week, we draw their attention to the subscription form which is printed on page xlv of the current issue. If this is sent, accompanied by the appropriate remittance, to the publishing offices, 36, Great Queen Street, W.C., it will ensure FLIGHT being received regularly each week upon the day of publication.

Claim for Bombing Sights

BEFORE the Inventions Commission on Monday the hearing of the claim by Major H. E. Wimperis, R.A.F., in regard to an invention of bombing sights for aeroplanes was concluded.

Mr. R. Moritz, for the Crown, admitted that the invention was clever and ingenious, and did much to assist the Air Service, but he contended that Major Wimperis was engaged as an officer to assist in carrying out experiments because of his special knowledge as a scientist. It would be establishing a dangerous precedent if officers, who, while engaged in special experimental work, happened to make a brilliant invention, were granted a special award. The artillery officer who invented the famous creeping barrage, which so wonderfully assisted our troops in France, did not receive any special award.

The Commission will promulgate their decision in due course.

NEW COMPANY REGISTERED

AERO POLISHES, LTD.—Capital £3,000, in £1 shares. Acquiring business of a polish manufacturer and dealer carried on by T. W. Buckley at 545, Bearwood Road, Smethwick. First directors: T. W. Buckley, A. C. Buckley and H. Walls.

AERONAUTICAL PATENTS PUBLISHED

Abbreviations:—cyl. = cylinder; I.C. = internal combustion; m. = motors.

APPLIED FOR IN 1915

Published July 8, 1920

43. SOC. CLERGET, BLIN ET CIE. Multi-cylinder I.C. engines.

APPLIED FOR IN 1918

The numbers in brackets are those under which the Specifications will be printed and abridged, etc.

Published July 8, 1920

- 10,156. H. S. BOOTH. Rotary motors. (144,331.)
18,037. SOC. DES MOTEURS SALMON. Apparatus for increasing range of speed of aeroplanes. (144,332.)

APPLIED FOR IN 1919

The numbers in brackets are those under which the Specifications will be printed and abridged, etc.

Published July 8, 1920

- 5,364. E. and U. RICCI. Water-planes and hydro-planes. (144,356.)
5,298. S. HEATH. Aerial propellers. (144,384.)
6,216. J. H. W. FLANAGAN. Stabilisers. (144,391.)
6,420. J. A. WEIS. Planes of aeroplanes. (144,395.)
10,186. C. REUSE. Means for lubricating and preserving rubber. (144,435.)
12,477. T. R. CAVE-BROWN-CAVE. Airship envelopes. (144,455.)
16,008. J. J. M. A. E. SCHNEIDER. Shock-absorber for landing-carriages. (141,004.)
16,076. W. C. MOOR. Inclinator for aircraft. (144,483.)

If you require anything pertaining to aviation, study "FLIGHT'S" Buyers' Guide and Trade Directory, which appears in our advertisement pages each week (see pages 1, li and lii).

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